TURKISH REPUBLIC OF NORTH CYPRUS

NEAR EAST UNIVERSITY

HEALTH SCIENCES INSTITUTE

DETERMINING THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY

AMONG UNIVERSITY FEMALE STUDENT DURING THEIR MENSTRUAL CYCLE.

UZOMA CHINYERE JENNIFER

MASTER THESIS

PUBLIC HEALTH NURSING DEPARTMENT

SUPERVISOR

PROF.DR. HATICE BEBIS

NICOSIA 2020

TURKISH REPUBLIC OF NORTH CYPRUS

NEAR EAST UNIVERSITY

HEALTH SCIENCES INSTITUTE

DETERMINING THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY

AMONG UNIVERSITY FEMALE STUDENTS DURING THEIR MENSTRUAL CYCLE.

UZOMA CHINYERE JENNIFER
MASTER THESIS

PUBLIC HEALTH NURSING DEPARTMENT

MENTOR
PROFESSOR DR.
HATICE BEBIS

NICOSIA 2020

AMONG UNIVERSITY FEMALE STUDENT DURING THEIR MENSTRUAL CYCLE
THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY
CHINYERE JENNİFERUZOMA

CONFIRMATION

To the Directorate of Health Sciences Institute;

This thesis study was accepted by the jury on 25.12.2020 as a Master's Thesis in the Nursing Program of the Near East University Institute of Health Sciences.

President of the Jury: Assist. Prof. Dr. Serap Tekbaş

Girne University Faculty of Health Sciences

Signature: *SAvcıoğlu*

Member:

Assist. Prof. Dr. Samineh Esmailzadeh

Near East University Faculty of Nursing

Signature:

Thesis Advisor: Assoc. Dr. Hatice BEBİŞ

Near East University Faculty of Nursing

Signature:

Approved by: Prof. Dr. K. Hüsnü Can BAŞER

Near East University

Health Sciences Institute Director

Signature:

STATEMENT (DECLARATION)

I hereby declare that this thesis study is my own study. I had no unethical behavior in all stages from planning of the thesis until the writing thereof. I obtained all the information in this thesis in academic and ethical rules. I provided reference to all the information and comments which could not be obtained by this thesis study and took their references into the reference list and no behavior rights and copyright infringement during the study and writing of this thesis and l defended this thesis on 25th December 2020.

Uzoma Chinyere Jennifer

Date......23/03/2021......

Signature: ....

4

ACKNOWLEDGEMENT

CONTENTS

4

ABBREVIATIONS AND ACRONYMS

PSQI: Pittsburgh Sleep Assessment Quality Index

FHPAST: Functional Health Pattern Assessment Screening Tool

NEU: Near East University

PMDD: Premenstrual dysphoric disease

PMD; Premenstrual disorder

FSH**:** Follicle stimulating hormone

LH: Luteinizing hormone

BMI: Body Mass Index

LIST OF TABLES

ABSTRACT

UZOMA CHINYERE JENNIFER. Determining The Relationship Between Functional Health and Sleep Quality Among University Female Students During Their Menstrual Cycle.

Introduction: Menstruation can also be called period or monthly is the frequent discharge of blood from the inner lining of the uterus through the vagina, bleeding lasts around 2 to 7 days. The menstrual cycle usually occurs due to the rise and fall of hormones, Various physical changes are brought by fluctuations in hormonal level during menstrual cycle. The menstrual cycle comprises of two main phases, the follicular phase (FP) and the luteal phase (LP). The menstrual cycle is associated with changes in circadian rhythms and sleep pattern. Menstrual cycle affects the quality of sleep of these student due to the rise and fall of hormones (estrogen and progesterone). Sleep quality is acknowledged as one of the crucial part of healthy sleep. Sleep plays a crucial role in our physical health, for an instance sleep is involved in the restoration of health after a stressful day and enables blood to flow throughout the sleep period. Comparatively, there are some literature proposing that sleep duration, quality and other factors are related to health outcome/issues including death rate.

Aim: The aim of this study is to develop a hypothetical model that explains functional health in University Female student; and construct and verify the functional health model for University female student with sleep quality.

Material and Methods: This was a descriptive, cross-sectional study conducted in the Nursing faculty of Near East University. A total of 200 international students participated in the study. A Socio- demographic questionnaire, FHPAST is made up of 11 category involving 57 items tools and 3 component solution available for use and PSQI, it consists of 19 items, 7 components score and 1 composite score were used for the data collection and evaluation of the study.**Statistical Analysis:** The relationship between socio-demographic characteristics and Functional health pattern assessment screening test and Pittsburg Sleep quality has been

analyzed using test of normality was conducted on the Pittsburg sleep quality scale and it was not normally distributed. Therefore, the Mann-Whitney test(U) and Kruska-Wallis test(Xkw) were used for variables comparisons, but for Functional health scale, Kruska-Wallis test was used. Research data were statistically analyzed in IBM Statistical Package for Social Sciences (SPSS) 24.0 software. Frequency analysis was used to determine the socio-demographic characteristics, functional health and sleep quality of the student and their knowledge about their sleep quality and their functional health in general. **Results and Discussion;** The purpose of this study is to determine the relationship between FHPAST and PSQI among university female students during their menstrual cycle. Participants were female students who has regular menstrual cycles (3-7 days of menstruation between intervals of 21-35 days)**,** to be an undergraduate female student in NEU nursing faculty. Majority of the participants were single students with 59.50%, and where in Year 4 with 38.00% and between the age of 21-25years with 63.00% and from Ghana with 41.50%. In the aspect of bleeding days one out of five had 2days of bleeding length, in the aspect of gynecological problems, majority of the students have endometriosis (42.10%) which they might not be aware of because of its signs and symptoms equivalents to menstrual cycle. A significant difference was found between the FHPAST and PSQI Scales and menstrual cycle frequency and BMI. No significant differences were noted between the scales and Age, Education.

   Conclusion and Recommendations: it is recommended that health education about personal hygiene during and after menstruation should be conveyed to female students, awareness among the female population regarding menstruation is necessary to alleviate unnecessary anxiety and depression. Women should have variety of sources of information about menstruation and avoid strenuous exercise prior and during menstruation, availability of means to dispose used sanitary pads and water to wash hand in schools and universities. Adequate hygiene for menstrual hygiene management, thereby safeguarding the dignity, bodily integrity and overall life opportunities of women and simple carbohydrate diet, avoiding alcohol and smoking and maintaining a proper immune balance can maintain optimum hormone balance and improve sleep and recommend further research; to conduct about sleep quality and functional health its prevalence during menstruation and extend the scope of study

   Keywords: Functional health, Sleep quality, University Female Students, Menstruation and Menstrual cycle.

ÖZET

UZOMA CHINYERE JENNIFER. Belirleme Adet Döneminde Üniversiteli Kız Öğrenciler Arasında Fonksiyonel Sağlık ve Uyku Kalitesi İlişkisi.

Giriş: Menstrüasyon dönemi veya aylık olarak da adlandırılabilir, kanın uterusun iç astarından vajinaya sık sık akması, kanama yaklaşık 2 ila 7 gün sürer. Adet döngüsü genellikle hormonların yükselmesi ve düşmesi nedeniyle oluşur, Adet döngüsü sırasında çeşitli fiziksel değişiklikler hormonal seviyedeki dalgalanmalarla sağlanır. Adet döngüsü iki ana fazdan oluşur: foliküler faz (FP) ve luteal faz (LP). Adet döngüsü, sirkadiyen ritimler ve uyku düzenindeki değişikliklerle ilişkilidir. Adet döngüsü, hormonların (östrojen ve progesteron) yükselmesi ve düşmesi nedeniyle bu öğrencinin uyku kalitesini etkiler. Uyku kalitesi, sağlıklı uykunun önemli parçalarından biri olarak kabul edilmektedir. Uyku, fiziksel sağlığımız için con önemli bir rol oynar, çünkü örneğin, stresli bir günün ardından sağlığın restorasyonunda uyku ve kanın uyku süresi boyunca akmasını sağlar. Karşılaştırmalı olarak, uyku süresinin, kalitesinin ve diğer faktörlerin ölüm oranı da dahil olmak üzere sağlık sonuçları / sorunları ile ilgili olduğunu öneren bazı literatür vardır.

Amaç: Bu çalışmanın amacı Üniversite Kız öğrencisinde fonksiyonel sağlığı açıklayan varsayımsal bir model geliştirmektir; ve uyku kalitesi ile Üniversite kız öğrencisi için fonksiyonel sağlık modelinin oluşturulması ve doğrulanması. **Gereç ve Yöntemler:** Bu çalışma Yakın Doğu Üniversitesi Hemşirelik Fakültesinde yürütülen tanımlayıcı, kesitsel bir çalışmadır. Çalışmaya toplam 200 uluslararası öğrenci katıldı. Sosyo-demografik bir anket olan FHPAST, 57 maddelik araç ve 3 bileşenli çözelti içeren 11 kategoriden oluşmakta ve PSQI, veri toplama ve değerlendirme için 19 maddeden, 7 bileşen puanından ve 1 bileşik puandan oluşmaktadır. ders çalışma. **İstatistiksel Analiz:** Sosyodemografik özellikler ile Fonksiyonel sağlık örüntüsü değerlendirme tarama testi ile Pittsburg Uyku kalitesi arasındaki ilişki Pittsburg uyku kalitesi ölçeğinde normallik testi kullanılarak analiz edilmiş ve normal dağılmamıştır. Bu nedenle değişken karşılaştırmalarında Mann-Whitney testi (U) ve Kruska-Wallis testi (Xkw)

kullanılırken, Fonksiyonel sağlık ölçeği için Kruska-Wallis testi kullanıldı. Araştırma verileri, IBM Statistical Package for Social Sciences (SPSS) 24.0 yazılımında istatistiksel olarak analiz edildi. Öğrencinin sosyo-demografik özelliklerini, fonksiyonel sağlık ve uyku kalitesini ve genel olarak uyku kalitesi ve fonksiyonel sağlıkları hakkındaki bilgilerini belirlemek için frekans analizi kullanıldı. **Sonuçlar ve tartışma**; Bu çalışmanın amacı, üniversite öğrencilerinin menstrüel döngüleri sırasında FHPAST ile PUKİ arasındaki ilişkiyi belirlemektir. Katılımcılar, düzenli adet döngüsü olan (21-35 gün aralıklarla 3-7 gün adet), YDÜ hemşirelik fakültesinde lisans öğrencisi olacak kız öğrencilerdi. Katılımcıların çoğunluğu% 59.50 ile bekar, 4. yılda% 38.00, 21-25 yaş arası% 63.00 ve Gana'dan% 41.50 ile öğrencilerdi. Kanama günleri yönünden beşte birinde 2 gün kanama süresi vardı, jinekolojik sorunlar yönünden öğrencilerin büyük çoğunluğunda endometriozis (% 42,10) adet döngüsüne eşdeğer belirti ve bulguları nedeniyle farkında olmayabilirler. FHPAST ve PUQI Ölçekleri ile adet döngüsü frekansı ve VKİ arasında önemli bir fark bulundu. Ölçekler ile Yaş, Eğitim arasında önemli bir fark kaydedilmedi.

Sonuç ve Öneriler: Kız öğrencilere menstruasyon sırasında ve sonrasında kişisel hijyen konusunda sağlık eğitiminin verilmesi, gereksiz anksiyete ve depresyonun hafifletilmesi için kadınlarda menstrüasyon konusunda farkındalığın sağlanması önerilmektedir. Kadınlar menstrüasyon hakkında çeşitli bilgi kaynaklarına sahip olmalı ve menstrüasyon öncesinde ve sırasında yorucu egzersiz yapmaktan kaçınmalıdır, okullarda ve üniversitelerde ellerini yıkamak için kullanılmış hijyenik pedleri ve suyu atmak için araçlar bulunmalıdır. Adet hijyeni yönetimi için yeterli hijyen, böylece kadınların haysiyetini, vücut bütünlüğünü ve genel yaşam fırsatlarını ve basit karbonhidrat diyetini korumak, alkol ve sigaradan kaçınmak ve uygun bir bağışıklık dengesini korumak, optimum hormon dengesini koruyabilir ve uykuyu iyileştirebilir ve daha fazla araştırma önerebilir; uyku kalitesi ve fonksiyonel sağlık hakkında menstrüasyondaki yaygınlığını yürütmek ve çalışma kapsamını genişletmek.

Anahtar Kelimeler: Fonksiyonel sağlık, Uyku kalitesi, Üniversite Kız Öğrenci, Adet ve Adet döngüsü.

CHAPTER ONE

INTRODUCTION

Menstruation can also be called period or monthly is the frequent discharge of blood from the inner lining of the uterus through the vagina (Jones & Bartlett 2011/ 2015), bleeding lasts around 2 to 7 days. Menarche is the first period of any female and it begin between the age of 12 and 15 years of age (Jones & Bartlett 2011). The length of time between the first day of a period and the first day of the next is 21 to 45 days in young women and in adult it is 21 to 31 days (average of 28days)(Office of Women's health 2015 & Diaz A et al 2006), the menstrual cycle length decreases with advancing age (Lenton et al., 1984), and approximately 7% of menstrual cycles are shorter than 26 days (Brodin et al., 2008) Menstruation usually cease after menopause usually at the age of 45 and 50 years, it also stops during pregnancy and resumes after breastfeeding (nichd.nih.gov 2015). The age at which every woman stop menstruating is not the same in all nation, every woman therefore menstruates approximately 2100 days which is correspondent to almost 6years of her reproductive life (S. Pokhrel et al 2014 & F. Thomas et al 2001).

Common signs (premenstrual syndrome) prior to menstruation include; tender breast, bloating, change in drive, menstrual cramping, headache, feeling tired, irritability, mood swing and acnes. Some women might have mild or no symptoms before the onset of menstruation (Office on Women's Health. 2015). The menstrual cycle usually occurs due to the rise and fall of hormones, Various physical changes are brought by fluctuations in hormonal level during menstrual cycle (Hofmeister, S; Bodden, S et al 2016). The menstrual cycle comprises of two main phases, the follicular phase (FP) and the luteal phase (LP). The follicular phase can split further into two sub phases; the early FP, which is characterized with low concentrations of the key hormones estrogen and progesterone; and the mid FP where estrogen is high independently from progesterone. The LP is typified by high concentrations of both estrogen and progesterone. These two main phases are separated by a steep surge in luteinizing hormone triggering

ovulation. These cyclical changes are said to be often predictable whilst spanning over the reproductive year (Friden C et al 2003).

The female reproductive hormone during menstrual cycle rises and fall throughout and it affect the cardiovascular, thermoregulatory, metabolic and respiratory parameters which in turns affect physiology and psychology of the student example via energy metabolism, changes in body temperature and fluid retention (Constantini NW et al 2005). Studies show that sex hormones may have influence on neurotransmitters such as GABA, serotonin, and glutamate, acting on membrane receptors (Darlington CL et al 2001, Friden C et al 2003), being able to influence different brain regions with alteration of sensory perception and motor responses (Smith MJ et al 2002, Barbosa MB et al 2007). Studies has also showed that suppression of gonadotropin-releasing hormone resulting from exercise-associated hypothalamic dysfunction can delay menarche and disrupt menstrual cycle patterns by limiting the secretion of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), (Warren MP et al 2001, Loucks AB et al 2003).

Functional health is the ability of an individual to perform all of her activities of daily living. Activities of daily living includes bathing, dressing up, using the toilet, grooming and feeding oneself. Functional health is a comprehensive concept which specify whether optimal level of spiritual functions, psychological state, and physiological wellbeing are maintained in people, families and communities in terms of holistic care (Gordon 1994). Functional performance tests are characterized as dynamic measures used to assess the general function of the body (Heleno LR et el 2016, Suda EY et el 2009, Caffrey E et el 2009). According to U.S. Department of Health & Human Services (2008), functional health (Physical activity) is necessary for women's health as it is linked with a decreased risk of cardiovascular disease; breast and colon cancers; and other adverse health outcomes. According to Warren MP (2001), high-intensity activity is associated with menstrual dysfunction and subfertility among high-performance female university students.

According to Katherine A, et, al (2014), conducted a research to evaluate the association between physical activity (PA) across the menstrual cycle and reproductive function using a cohort study with population of (n=259) women with validated questionnaires and daily diaries. The study observes a modest association between time-varying physical activity and healthy premenstrual women. At the end of the study the lack of ovulation among women who are

regularly menstruating was not affected by physical activity level, also high level of physical activity throughout the menstrual cycle was associated with low level of luteal progesterone and leptin. Another study which is an observational study of physical activity and hormone among reproductive-aged women and there is also lower concentrations of leptin and luteal progesterone (De Souza MJ, et al 1998 & 2010).

Sleep quality is how well one sleep. Sleep is made up of rapid eye movement, characterized by decreased muscle tone during sleep, and non-rapid eye movement. Sleep level repeats at a cycle of 90-129 minutes between rapid eye movement sleep and non-rapid eye movement and at night it occurs about 5 cycle (Miller EH 2004). National Sleep Foundation (NSF), a good quality sleep means when one falls asleep in 30 minutes or less than that, sound sleep through the night with no more than one awakening, and go back to sleep in the next 20 minutes if one wakes up. The American Academy of Sleep Medicine (2008)**,** disclosed that one with sleep disorder (delayed sleep syndrome), were likely to have irregular menstrual cycle.

A study conducted to evaluate the prevalence of premenstrual dysphoric disorder (PMDD) and its impact on sleep quality in female university students and at the end the result shows that university students with PMDD perceived their sleep quality to be poor and also the data in this study shows that poor sleep quality relate to PMDD symptoms. About 25% of the prevalence rate of this study shows that PMDD is a crucial issue in female students' reproductive health (Habibolah Khazaie, et al, 2016)

Sleep quality among Nursing Female students is a theme that has been studied worldwide because of its effects on the academic routine and personal life of this Students (Pagnin D et al 2014, Ribeiro et al 2014, Del Pielago et al 2014, & Cardoso HC, et al 2009). Therefore, investigating sleep quality by means of an instrument that has been validated for use worldwide and allows quantification, such as the PSQI, (Bertolazi AN et al 2011) is crucial, for the monitoring of sleep health in such students, aiding in the planning of interventions aimed at raising awareness of this problem (Buysse DJ et al 1989).

Sleep quality also changes during different phases of the menstrual cycle. Sleep is necessary for survival of all living beings. Various studies imply that sleep is needed to maintain metabolic-caloric balance, thermal equilibrium and immune competence. Sleep is also necessary for learning and memory consolidation (Barrette Barman Boitano et al 2015, Alverez

GG et al 2004). Similarly sleep deprivation leads to lifestyle diseases like obesity, hypertension and diabetes mellitus and also associated with chronic inflammatory conditions. Sleep quality should be good enough in addition to total time spent in sleep (Alverez GG, et al 2004, & Born J. et al 1999). Some studies have recorded a poorer sleep quality among university female students than in their male counterparts (Cheng et al., 2012; Saygin et al., 2016). When there are hormonal changes in female resulting from menstruation (Baker and Driver, 2007; Orff et al., 2014).

STUDY AIM

The aim of this study is to determine the effect of menstrual period of university female students on sleep quality and functional health.

STUDY QUESTIONS
  Female Students:

1. Does socio demographic characteristics have any effects on menstrual cycle symptoms?
2. Are the symptoms of menstrual period effective on sleep quality?
3. Are the symptoms of menstrual period effective on their functional health?
4. Is there a relationship between functional health scores and sleep quality scores?

<center>**CHAPTER TWO**</center>

GENERAL INFORMATION

2.1. OVERVIEW OF MENSTRUAL CYCLE

Regulation of the menstrual cycle begins with influences at the level of the hypothalamus, the hypothalamus stimulates the anterior pituitary gland which stimulates the ovaries and menstrual cycle is regulated by feedback and cross talk between these different components (Hawkins and Matzuk et al 2002). The hypothalamus secretes gonadotropin releasing hormone (GnRH) which stimulates the anterior pituitary to secrete both follicle stimulating hormone (FSH) and luteinizing hormone (LH). The gonadotropins stimulate the ovary to produce the steroid hormones, estrogen or progesterone, the ovarian steroid hormones in turn stimulate endometrial proliferation and affect many end organs. Although estrogen and progesterone have some feedback at the level of the hypothalamus, the more dynamic feedback occurs at the level of the anterior pituitary (Pangas SA et al 2004). There are three stages of menstrual cycle namely;

1. Menstrual phase
2. Follicular phase
3. Ovulation phase
4. Luteal phase.

1. Menstrual phase; this is the first phase of the menstrual cycle. In this phase the estrogen and progesterone level are decreased. During this phase, a combination of blood, mucus and tissue from the uterus are released. Symptoms during this phase includes; cramps, breast tenderness, bloating, mood swings, tiredness, headache, irritability and low back pain. (Stephanie Watson 2018.)

2. Follicular phase; this is the second phase of menstrual cycle. An average follicular phase lasts for about 16 days. It depends on one's cycle; it might range from 11 to 27days. This

<center>16</center>

phase commences on the first day of the menstruation and end on the ovulation day. Its initiation begins when signal is sent from the hypothalamus to the pituitary gland for the production of follicle stimulating hormone (FSH) and this hormone in turn stimulate the ovaries to produce follicle. (Stephanie Watson 2018.)

3. Ovulation phase; this phase varies depending on the cycle of days by an individual. It commences with the rising of estrogen from the follicular phase which triggers the pituitary gland for the production of luteinizing hormone (LH). It is when the ovary releases a mature egg and the egg travels down the fallopian tube towards the uterus to be fertilized by sperm. This is the phase in which on can get pregnant and symptoms involved in this phase include; discharge with texture of an egg white (thick) and slight rise in basal body temperature. (Stephanie Watson 2018.)

4. **Luteal phase;** this phase last for 11 to 17 days. After the follicle releases its egg it changes to corpus luteum, which releases estrogen and mostly progesterone which keeps the uterine lining thick and ready for fertilization. If pregnancy doesn't occur during the ovulation and luteal phase then premenstrual syndrome occur and they include; bloating, mood changes, headache, weight gain, food craving, changes in sexual desire and trouble sleeping. (Stephanie Watson 2018.)

One of the changes that occur during menstruation is a change in body temperature. It is linked with the luteal phase of the menstrual cycle (Pivarnik, Marichal, Spillman, & Morrow, 1992), which is due to the effect of progesterone. During the follicular phase there is high rate of musculoskeletal injuries, or around ovulation time when estrogen level is high (Balachandar, 2017; Herzberg et al, 2017). Folliculogenesis, ovulation, luteinization, and endometrium growth decline during the menstrual cycle and it depend on autocrine, paracrine, and endocrine factors produced from this site (Speroff L, Fritz MA.2005). At puberty clutches of follicles begin folliculolgenesis, entering a growth pattern that ends in death (apoptosis) or in ovulation (the process where the oocyte leaves the follicle).

Folliculogenesis is the maturation of the ovarian follicle, a densely packed shell of somatic cells that contains an immature oocyte, it can also be the process of preparing a single oocyte from a primordial follicle for ovulation (. Speroff, L. et al 2005; Matzuk MM, et al 2002; & Matzuk MM 2002). Folliculogenesis describes the progression of a number of small primordial follicles

into large pre-ovulatory follicles that occurs in part during the menstrual cycle. There are six stages of folliculogenesis namely;

a) Primordial follicle (made up of Oocyte, Oocyte nucleus, Ovary cortex cell and Granulosa cell),

b) Primary Follicle (made up of Granulosa cell, Oocyte, Zona pellucida and Oocyte Nucleus),

c) Secondary Follicle (comprises of Granulosa cell, Oocyte nucleus, Oocyte, Zona pellucida and Theca cells),

d) Tertiary Follicle (comprises of Antrum, Oocyte, Cortex, Theca cell and Granulosa cell),

e) Ovulating Follicle (made up of Oocyte, Granulosa cell, Ovary and Ruptured follicle)

f) Corpus Luteum (ovary, corpus luteum) (Anderson LD, Hirshfield AN. 1992; Dong J, et al. 1996; & Hirshfield AN. 1991).

According to American College of Obstetricians and Gynecologists. (2015), premenstrual symptoms are different in every woman and there are physical and emotional symptoms and it changes throughout life.

Physical symptoms include:

➢ Swollen or tender breast

➢ Constipation or diarrhea

➢ Bloating or a gassy feeling

➢ Abdominal cramps

➢ Headache or backache

➢ Clumsiness

➢ Lower tolerance for noise or light

Emotional symptoms include:

➢ Hostile behavior

➢ Fatigue

➢ Sleeping problems (sleeping too much or too little)

➢ Food craving

➢ Trouble with concentration or memory

➢ Anxiety

➢ Mood swings

➢ Increased libido

➢ Depression

These premenstrual symptoms can be relieved in the following ways:

- Regular aerobic physical activity throughout the month which can be of help to reduce fatigue, depression and difficulty in concentration. (El-lithy, A. et al 2014 & Aganoff, J. A et al 1994).

- Applying hot packs on the abdomen and drinking of hot or warm water helps to relieve abdominal pains/cramps.

- Eat healthy balanced diet, it helps to keep one healthy throughout the period and avoid foods and drinks with caffeine, salt and sugar within 1-2 week before menstruation because it helps to lessen premenstrual symptoms. (Kaur, G. et al 2004).

- Develop healthy ways to cope with stress, example yoga, massage, talk with family and friends and medication is also helpful. (Tsai, S.Y. 2016, Hernandez-Reif, M. et al 2000 & Arias, A.J., et al 2006).

- Have enough sleep/rest, which helps lessen anxiety, depression and also lack of sleep can worsen mood swing. Ensure to get at least 8hours of sleep each night. (American College of Obstetricians and Gynecologists. 2015).

- Avoid smoking, because it increases premenstrual symptoms. (Dennerstein, L., et al 2011).

According to WHO," Hygiene refers to conditions and practices that help to maintain health and prevent the spread of diseases." Personal hygiene refers to maintaining the body's cleanliness. Just about 26% of the female population are of reproductive age and these women menstruate between 2-7days in a month (Population Reference Bureau 2011). Menstruation is the discharge of blood through the vagina and Various socio-cultural factors made it difficult for menstruation hygiene to be possible because culturally it is considered a taboo which is rarely talked about. (Sommer et al 2015). To cope with menstruation hygienically, it is necessary for women to have access to water and sanitation, a private place to change sanitary pads and change pads every 2hours, clean water for hand washing, avoid the use of soap in vagina and change of clothes and where these used sanitary pads can be disposed appropriately. Men and women should be aware of menstrual hygiene (Sommer and Sahin 2013)).

During menstruation, body temperature rises which causes sleep disturbance and to avoid it take a warm bath prior to bed and make the bedroom cooler which enables you to sleep well. Also one tends to feel depressed and anxious so to avoid these being the cause of sleep disturbance some yoga and deep breathing exercise before bed time will help get mindset to sleep well (National Sleep foundation 2020).

According to a research by Winnifred Cutler, Ph.D., a reproductive biologist and president of Athena Institute for Women's Wellness in Chester Springs, Pennsylvania and her colleagues says that there is a connection between sex and menstruation and they found out that women (old wives tale) who are exposed to men pheromones regularly tends to have regular menstruation and less pain during menstruation than women who don't while some researchers also suggest that marriage can influence menstrual cycle and also increase its symptoms like menstrual cramps and headaches.

2.2 MENSTRUAL CYCLE AND ITS EFFECT ON FUNCTIONAL HEALTH

Menstruation can also be called period or monthly is the frequent discharge of blood from the inner lining of the uterus through the vagina (Jones & Bartlett 2011/ 2015). The menstrual cycle is associated with changes in circadian rhythms and sleep pattern. Menstruation is sometimes considered 'taboo' that is mocked or considered insignificant (Kissling, 2006). However, fewer studies assessed the effect of functional health (physical activities) on concentration of circulating hormones (Tworoger SS et al 2007, Verkasalo PK et al 2001 & Nagata C et al 1997), and were limited by assessing functional health (physical activities) at one point and would rather collect blood samples two to three time across the menstrual cycle.

According to a study by a researcher at Karolinska Institute's Department of Clinical Research and Education at Södersjukhuset (Stockholm South General Hospital) and her colleagues with women aged 40- 45years and sample size was about (n=1,500) women and at the end of the study it was concluded that women with heavy menstrual bleeding shows reduction in social activities and quality of life. Majority of the women sees bleeding as bothersome and they feel shabby and irritable about it, and around 16% of these women went on sick leave from work (Lena Marions et al 2016). Another study by a gynecologist and professor at the Department of Women's and Children's Health at Karolinska Institute and her colleague carried out a research about how women with regular and normal menstruation are affected in their physical activity performance

during their menstrual cycle (Angelica Lindén Hirschberg et al 2016). Their studies reveal valid proof that women have slight harmonization before ovulation and retrogression before menstruation, also a result that is possibly authenticated by other studies shows that during this cycle there is high risk of injury linked with sport activities. There were problems encountered during this study like being in dominance of the menstrual cycle of all participant, persistent measurement of hormones through blood and urine, one or more study participant not ovulating in the survey (Angelica Lindén Hirschberg et al 2016).

2.3 MENSTRUAL CYCLE AND ITS EFFECT ON SLEEP QUALITY.

Sleep quality is how well one sleep. Menstrual cycle affects the quality of sleep of these student due to the rise and fall of hormones (estrogen and progesterone). Sleep quality is acknowledged as one of the crucial part of healthy sleep (Buysse, 2014), yet the index of a good or bad sleep is contingent on the individual perception not the characteristic behavior of his/her state. The ubiquity of sleep disturbance is very much in widespread population; it ranges from 8% (Ohayon, 2002) to more than 30% as said by the U.S. National Health and Nutrition Examination Survey (Basil et al 2011).

According to American Academy of Sleep Medicine (2005), poor sleep quality is one of the major cause of sleep disorder (insomnia, circadian rhythm disorder etc.). Sleep disruption occurs exclusively during the luteal phase of the menstrual cycle, remit after the onset of menses, and disappear throughout the follicular phase (Grady-Weliky TA. 2003). Some studies show that work-related stress increases in PMS (premenstrual syndrome) or PMDD (premenstrual dysphoric disorder), (Deuster PA et al 1999 & Hourani LL et al 2004). Stress due to various hours of study and work-related pressure affect sleep disturbance in adolescent girls. A study by Parry and colleagues never showed a different in EEG test between control group and women with PMDD (Parry BL et al 1999), yet some other studies shows regardless of the menstrual phase, there is significant increase in rapid eye movement, sleep onset latency and increased stage-two sleep. (Baker FC, et al 2007 &Parry BL, et al 1989). Another study by Parry BL et al (1997), conducted a study with 21 women with PMDD and 11 women as normal control group and it shows that in the 21 women with PMDD at the luteal phase there is decreased amplitude, mean level and onset

time of melatonin were delayed compared to follicular phase. Then in the 11 women (normal control group), there is no significant change in the melatonin throughout the menstrual cycle.

2.4 RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY

Sleep plays a crucial role in our physical health, for an instance, sleep is involved in the restoration of health after a stressful day and enables blood to flow throughout the sleep period. Comparatively, there are some literature proposing that sleep duration, quality and other factors are related to health outcome/issues including death rate (Cundrle I. et al 2014, Dew MA, et al 2003, Irwin MR, et al 2006 & Li Y, et al 2013), hence, research carrying out the relationship between social link and aspect of sleep may assist simplify the method by which social constrain are affiliated to long-term health outcome. Functional health and sleep quality are important in one's life because both co-exist with each other.

According to Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion (2008), says that lately, the effect of lack of sleep has be known as an important public health challenge in the USA, currently an estimate of about 10% American population have chronic insomnia and more than half reported not getting enough sleep and has been linked to behavioral health risk factor. A study carried out by Rui Chen et al (2014), on relationship between sleep quality and functional exercise capacity in COPD and (n=103) populations with stable COPD were used for the study and at the end of the research study there was a close relationship between sleep quality and functional exercise capacity in patients with COPD. Prior studies have displayed that subjective and objective variables, such as sleep latency, sleep duration, or sleep efficiency could differ (Guedes, L. G. et. al. 2016, Armitage, R et. al. 1997 & Landry, G. J.et. al. 2015).

According to Rebecca A, et. Al. (2014), conducted a study about the relationship between sleep and physical function in community-dwelling adult: a pilot study of about (n=50) community-dwelling adults. About 50% of the population have disturbed sleep which hinder them from daily functioning, affect health and plays a role in reduction of quality of life. (Foley D, et. al. 2004). This study suggested that short term sleep is associated with preclinical disability. Some studies focused on the effect of exercise on sleep in different population with poor sleep quality and the result shows that it is mostly common in older adults, across these studies, there is an improved result in subjective sleep quality following exercise training is the most compatible finding. (Yang PY, et. al. 2012). Singh et al. found resembling amendment in subjective sleep quality between low- and high-intensity resistance exercises in older adults, (Singh NA, et. Al. 2005)

2.5 MENSTRUAL CYCLE AND ITS ECONOMIC EFFECTS

Day by day about 300 million more women are menstruating (George R. 2013). There is an increased realization that this natural process is experienced negatively and its hindrance to health and gender equality in low- and middle-income contexts (Sommer M. et. al. 2016). Preliminary survey focused on adolescent girls discloses that menstruation was experienced with discomfort and fear (Sommer M.2009 & Dolan CS et. al. 2014). The core challenges include; lack access of clean reliable materials to absorb menses, supportive sanitation infrastructure, practical information about menstruation were not highlighted (Sommer M. et. al. 2013 & House S. et. al. 2013) Studies recommend that these challenges negatively impacted school participation (Dolan CS et al 2014, Long J et al 2013 & Sommer 2010) health, and well-being (Crichton J. et. al. 2013, Mason L et al 2013, Phillips-Howard PA. et. al. 2016 & Torondel B. et. al. 2018). Few studies of adult women have highlighted that they lack resources and support which may contribute to stress and absence from employment (Caruso BA. et. al. 2017 & Krenz A. et. al. 2018).

2.6 MENSTRUAL CYCLE AND ITS PSYCHOLOGICAL EFFECT

The neuroendocrine system is the mechanism by which the hypothalamus regulates reproduction, metabolism, osmolality and blood pressure and also maintain homeostasis. This system helps to regulate the psychological function of an individual and also regulate his day to day activities e.g. the brain. The neuroendocrine system also plays an important role by assisting

the normal physiological function and during stress, it plays a crucial role to regulate the endocrine and reproductive system which enables settling in of high demands and maintain homeostasis in response to external threat (Harlow SD. et. al. 1995 & Dimsdale JE. et. al. 1980). More so, the sequel that is cortisol has varieties of side effect which includes the interference of Luteinizing hormone rhythm which in turns affects menstrual cycle (Kudielka BM et al 2005 & Loucks AB. et. al. 1989)**.**

Diverse research studies have showed that stress is among the key factors responsible for menstrual irregularities (Lin HT. et. al. 2007 & Harlow SD. et. al.1991), various studies has evaluated the link between stress and menstrual cycle. A research study carried out among India medical students shows that high level of stress among them (Singh R. et. al. 2012). As side from psychological differences, factors like; drugs, physical activities, nutrition, environment and stress (physical, emotional and mental) have been found to cause menstrual disorders (Pamela 2009). Due to impressive body of cross-sectional and prospective studies, the effect of stress especially chronic stress has been confirmed on female menstrual characteristics (Christiani et. al. 1995, Mei et. al. 2010). Congruous link has been noticed for cardiovascular, musculoskeletal disorders, mental illness and both prevalence as well as severe menstrual irregularities (Kivimaki et al, 2006, Stansfield et al, 2006, Deeney et. al. 2009).

Recognized stress among University female student may take the form of academic stress, which involves multiple stressors such as academic demands, financial, time, health related and self-imposed type of stressor (Pamela 2009). The fundamentals of Academic demand of academic stress include the student's awareness of vast knowledge base required and the perception of inadequate time to develop it (Carveth et. al. 1996). All these will put the female undergraduate under ever increasing tension. These have been associated with negative health outcomes including depression and physical illness such as (lack of energy, loss of appetite, headache, sleep problems and gastrointestinal problems) (Winkelman, 1994, Mori, 2000 and Pamela, 2009).

2.7. MENSTRUATION CYCLE EFFECTS ON SLEEP QUALITY AND FUNCTIONAL HEALTH AND THEIR NURSING ROLES

According to the American Nurse Association's (ANA) Code of Ethics for Nursing with Interpretive Statements (2015), provision 8 states that nurses have a responsibility to "collaborate

with other healthcare professionals to protect human rights, promote health diplomacy and reduce health disparities." In other words, in addition to providing safe and appropriate healthcare, nurses have a responsibility to defend the basic human rights of their clients. Section 8.2 of the Code of Ethics for Nursing also states that nurses must "lead collaborative partnerships to develop effective public health legislation, policies, projects and programs that promote and restore health, prevent illness and alleviate suffering" (ANA, 2015). It is clear that the Code of Ethics for Nursing dictates that nurses have a responsibility to participate in health promotion of communities as well as individuals (ANA, 2015). Nurses should use the Code of Ethics to guide their everyday practice as well as their roles in the community.

A book written by Sara Shah, (2020) on how menstruation affects sleep quality, she quotes that 'about 30% of women experience sleep problems during menstruation, reduced sleep quality during the night affect the individual during the day leading to lack of concentration, mood swings, lack of energy to perform daily activities and relationships problems from loved ones'. A study in (2018), shows that poor sleep quality is found in women who suffers from painful menstrual cramps or premenstrual syndrome. According to Angelica Lindén Hirschberg and her colleagues, (2016), they also studied how women with regular and usual menstruations are affected in performing their physical activities during menstruation. In their study there is evidence that just before 'ovulation', there is slight improvement in co-ordination and deterioration in balance before menstruation. A result which might have been confirmed by other studies showing increased risk in injury associated with sports during ovulation phase is likely to be at a higher side.

PRIMARY LEVEL (health education and awareness); In order to improve menstrual hygiene conditions in a population the goal of nurses and other healthcare professionals should be to foster a safe and understanding environment in which menstrual and reproductive health can be discussed comfortably, through methods that are culturally sensitive. Women that do not have regular access to menstrual products are more likely to practice unclean and unsafe hygiene out of necessity and desperation (Little, 2015).

The common occurrence of improper menstrual hygiene in female population has been a growing public health issue throughout the world (Kurlander, K. 2019). Worldwide, women are being faced with problems like availability of feminine hygiene products, reliable information about menstruation and places for disposal of used sanitary pads (Kurlander, K. 2019). The

unavailability of this menstrual resources can lead to inadequate menstrual health management and which can become a threat to the health and safety of women (Sommer and Sahin 2013). The ability to practice good menstrual hygiene is first and foremost a human rights issue, feeling healthy and clean strongly contributes to a person's sense of dignity and their ability to function in daily life. For these reasons, all women deserve the opportunity to practice good menstrual hygiene throughout their lives (Kuhlmann et al., 2017).

Marni Sommer and Murat Sahin (2013) defined menstrual health management as "using a clean menstrual management material to absorb or collect blood that can be changed in privacy as often as necessary for the duration of the menstruation period, using soap and water for washing the body as required and having facilities to dispose of the used menstrual management materials".

Unsafe practices include leaving products, such as tampons and pads, inside or touching the body for longer than recommended, reusing soiled products and inadequate cleansing the genitals and perineal region (Little, 2015).

A study was carried out in china on promoting the menstrual health of adolescence girls and also the study investigated the effect of culturally and development of nursing intervention on menstrual health of this girls (n=116), aged 12-15years, two groups were involved intervention group and normal group and at the end of the study, the intervention group has a significant improvement in the aspect of knowledge regarding menstruation knowledge, healthcare behavior and self-care confidence during menstruation (Deborah Lindell 2016) We recommend that professional nurses globally advocate for school nursing and routine menstrual health education for adolescent girls. According to UNICEF 2019, the onset of menstruation (menarche) coexist with vulnerabilities and new life opportunities which arises during adolescence.

During this period, health education in the aspect of life skill development, menstruation and sexual aspect should be given to both the girls, boys and family members, which enables the girls to overcome obstacles to their health, freedom and development, such as gender-based violence, child marriage and school dropout. Investments in adolescent girls' well-being yield triple dividends: for those girls, for the women they will become, and for the next generation (UNICEF 2019)

A pilot study was carried out among college students for sleep promotion program and its aim is to survey about changes in sleep knowledge and sleep diary parameters. At the end of the study,

89% completed at least one of the intervention component either in-person or sleep diary, participant reported improved knowledge and change in sleep diary parameters due to active intervention components by replied feedback emails and presentation on sleep health based on participant's baseline sleep dairy (J.C. et. al. 2016/2017).

SECONDARY LEVEL (early detection and prevention); Women who practice improper use of feminine hygiene products place themselves at an increased risk for infections. One major health issue that is commonly seen with tampon and pad use is toxic shock syndrome. Toxic shock syndrome is a complication of bacterial infections that can progress to shock, renal failure and death (Durkin, 2017). Tampon and pad usage already creates an environment that promotes the growth of bacteria inside or near the body. When a tampon is left inside the body for too long it can become dried out and cause create tears in the vaginal walls (Durkin, 2017). These tears then serve as an entry point for bacteria into the bloodstream, which can lead to infections of varying severity (Durkin, 2017). The best way to prevent toxic shock syndrome is to change tampons and pads frequently (Durkin, 2017). The use of improper materials to control menstrual bleeding is also another problem among women. Nurses take part in this intervention by supporting programs that collect feminine hygiene products, by educating themselves on where these kinds of programs are located in the community and by directing clients to organizations that are known to distribute free feminine hygiene products and actively paying attention to health initiatives that take place in the community is an important action that public health nurses must take in order to help clients that are identified (Davis, 2018).

Premenstrual syndrome should be detected early and the health education about it should be give earlier during health education to be able to solve it in time before menstruation. About 90% of women reported suffers from PMS such as headache, bloating and mood swings (Winer, S. A. et. al. 2006). Most women might have PMS which will hinder them from going to work or miss schools, on an average woman in their 30s are more likely to have PMS (Dennerstein, L. et. al. 2011). Various dietary supplements which were naturally produce can reduce symptoms of PMS, like irritability, bloating, anxiety, fatigue and depression and foods like fish, potatoes and also calcium supplement and also evening primrose oil is beneficial in reducing PMS symptoms (National Institute for Health Research, U.K. 2008, Dietz, B. et. al. 2016 & Ghanbari, Z. et. al.

2009). The premenstrual symptom is a complex one, women experience this symptoms ranging from moderate to severe and to manage PMS, the initial step is daily regular exercise and change in diet. A life style changes is sufficient to control symptoms for women with mild symptoms. (Aganoff, J. A. et. al. 1994).

Early detection of sleep disorder can have immediate solution, some of which include lifestyle; intake of more vegetable and fish and reduction in sugar intake, relieving stress by mild exercise and stretching, sticking to a particular time for bedtime, limit intake of water and eating smaller low carbohydrate meals before bedtime (Centers for Disease Control and Prevention2016).

Mild activity can reduce or prevent depression and stress. Activity can also help improve your sleep and active lifestyle has many benefits, such as helping you prevent or manage health conditions (IBM Corporation 2020). Regular physical activity of moderate intensity – such as walking, cycling, or doing sports – has significant benefits for health and Insufficient physical activity is one of the leading risk factors for global mortality and is on the rise in many countries, adding to the burden of NCDs and affecting general health worldwide. People who are insufficiently active have a 20% to 30% increased risk of death compared to people who are sufficiently active (WHO 2020).

TERTIARY LEVEL (pain, finance); Assuming that the average tampon-using woman would reapply products every 4-6 hours when on her period, thus using about 20 tampons per the average length of a cycle (Kane, 2017). Factors such as management of menstrual side effects (i.e. pain medications, hot and cold therapies), replacing soiled clothing items and use of alternative menstrual management methods (menstrual cups, contraceptive pills, etc.) could also be considered when studying the financial repercussions of feminine hygiene. Mild exercise such as yoga and other mild exercise should be done to relieve pain during menstruation. During menstruation warm water should be taken before bed time to be able to sleep soundly and caffeine and carbonated drunks should be avoided, also sugary time should be avoided 1-2weeks before menstruation. However, Kane's (2017) estimated cost of tampons used throughout a woman's life is a valuable measurement because it demonstrates the costly nature of adequate menstrual health management.

Menorrhagia is the medical term for menstrual periods with abnormally heavy or prolonged bleeding and with this condition activities of daily living is not stable because of loss of blood and excessive cramps. Some signs and symptoms of menorrhagia include; soaking through one or more sanitary pads or tampons every hour for several consecutive hours, needing to use double sanitary protection to control your menstrual flow, bleeding for longer than a week, passing blood clots larger than a quarter, symptoms of anemia, such as tiredness, fatigue or shortness of breath and the following might be the cause; hormonal imbalance, uterine fibroid, dysfunction of the ovaries and uterine polyps etc.(Mayo Foundation for Medical Education and Research 2020).

CHAPTER THREE

MATERIALS & METHODS

3.1 THE STUDY DESIGN

This study was carried out as a descriptive cross-sectional study between February- December 2020

3.2 THE STUDY SITE

3.2.1. LOCATION DESCRIPTION

Near East University, established in 1988, offers high quality education with 438 programs comprising 220 associate degree and undergraduate programs. The First Faculty of Nursing of the Turkish Republic of Northern Cyprus was established under the umbrella of Near East University with the approval of the Council of Higher Education and the Higher Education Planning, Evaluation Accreditation and Coordination Council (YÖDAK).

3.2.2. Education Description

Near East University Faculty of Nursing, formerly Department of Nursing, is the pioneer offering master's degree and PhD programs in nursing in the Turkish Republic of Northern Cyprus. The Department of Nursing, known as Near East University- Faculty of Nursing now, began to offer master's degree programs under the umbrella of Near East University Faculty of Health Sciences in 2007. A year later, in 2008, it launched PhD programs in nursing. It has played a crucial role not only in meeting the nurse demand of our country but also in paving the way for graduates to build a distinguished career over the others (NEU website). Near East University Faculty of Nursing provides education in Turkish and English. Students studying in English come

from Nigeria, Somalia, Zimbabwe and other countries. Near East University Near East Nursing Faculty, Nigeria and Zimbabwe Governments are accredited by the Ministry of Health.

3.3 STUDY POPULATION AND SAMPLING

The population of the research; Near East University Faculty of Nursing English International (N = 240) students. It is aimed to reach all students who have not been selected for sampling. The sample of the study consisted of (n=200) students.

3.3.1. Inclusive Criteria for Research Sample

➢ To be regular menstrual cycles (3-7 days of menstruation between intervals of 21-35 days)
➢ To be an undergraduate female student in NEU nursing faculty.
➢ Being able to fully understand the purpose of the study and voluntarily participate.
➢ To be able to understand the survey question and respond.

3.3.2. Exclusive Criteria for Research Sample

➢ Students who are amenorrhea
➢ Female students who has any underlying disease (e.g. cardiovascular etc.)

3.4 STUDY VARIABLES

The study analysis was based on the dependent and independent variables.

3.4.1. The dependent variable

The dependent variables included the Functional health scale and Sleep quality index scale.

3.4.2. Independent variable

The independent variables are the Students and Social demographic characteristics.

3.5 DATA COLLECTION

The Socio demographic questionnaire, Functional Health Pattern Assessment Screening Test and Pittsburgh Sleep Assessment Quality Index were used to data collection.

3.5.1. The Socio-Demographic Questionnaires

Personal information form was prepared by the researcher according to literature (NIHCE 2020). The personal information form was included in the socio-demographic section of the questionnaire. These include; age, academic year, body mass index, marital status, country of origin, gynecological problems and menstrual cycle problems/characteristics (Questions 1 to 21). Refer to appendix 1 of the thesis for the questions.

3.5.2. Functional Health Pattern Assessment Screening Test (FHPAST) Scale

The FHPAST, was developed by Maryjorie Gordon in 1987 and is made up of 11 categories which makes it possible for a systematic and standard approach for data collection and enables the nurse or researcher to determine the aspect of human functions and these categories include;

- *health perception and health management* (Questions about life style, health and wellness)
- *nutrition and metabolism* (Specific questions about foods, weight and any skin issues)
- *elimination* (Questions about urination and bowel elimination patterns and any assistive devices).
- *activity and exercise* (Questions about daily activity and if there are any assistance).
- *cognition and perception* (Questions about visual, hearing, hearing, reading, writing and speaking problems).
- *sleep and rest* (Questions about sleeping pattern, time, wake up time and problems associated with sleeping).
- *self-perception and self-concept* (Questions about oneself, concern, and feelings).
- *roles and relationships* (Questions about relationship, family, groups, friends, and conflict resolve).

- *sexuality and reproduction* (Questions about activity, protection from transmitted infection, changes, problems, pregnancy and menstruation).
- *coping and stress tolerance* (Questions about major changes in life, how to handle problems, mood status and any medication used for relaxation).
- *values and beliefs* (Questions about plans and goals of future, importance of religion and any personal values, belief maybe compromised).

It involves 3 components which includes;

Component 1; (Health risk), with 17 items (Fear for safety, risk for physical harm, difficulty urinating , unusual physical symptoms with walking, recreational drugs, problem with bowel elimination, physical ability limit daily activity, pain interrupt daily activity, feels guilty when drinks are taken, difficulty in controlling anger, family problems finds difficulty to handle, experience physical discomfort when under stress, smoke cigarette, burden to participate in family caretaking activities, difficulty with vision, feel stress, tension or pressure and worry a lot) had a Cronbach's alpha of .97.

Component 2; (General wellbeing), with 27 items (Feel good about oneself, feel in control of life, feel good about decisions made likes looks, happy with life, hopeful about the future, satisfied with problem solving ability, able to cope with stress in life, consider oneself healthy, adjust to changes in life, enough energy for daily activities, satisfied with social life, in excellent health, heals easily, able to learn new information easily, feels comfortable with role played in the family, fall asleep without a problem, feels communication with other feels, concentrate for a long period of time, feels rested when awoken, comfortable with weight, choice made are consistent with values, satisfied with work, comfortable expressing feelings and emotions, have someone to talk to when in need/support, comfortable with sexuality and able to hear clearly), had a Cronbach's alpha of .93.

Component 3; (Health promotion), with 13 items (have annual health examination, able to follow recommendations from health care providers, intentionally limit dietary fat intake, eats 5-6 serving of fruits and vegetable daily, seek immediate attention for changes in health, wears seat belt, health is important, religion/spiritual practices gives meaning to life, avoid sun or use sunscreen, drink 6-8 glasses of water daily, can make changes in lifestyle to improve health, do aerobic exercise for 20mins or more times in a week, and have usual routine performed for relaxation) had a Cronbach's alpha of .78.

Thus, the now 57-item FHPAST measuring three major components of FHPs was judged sufficiently reliable and valid for use as independent measures in subsequent research. It can be used in both children and adults. The application takes about 5- 10minutes to complete. In the scale, If the response is rated 1 or 2 for items 1–42, it is a predictor of a potential problem or risk within one or more of the applicable FHPs. If the response is 3 or 4 for items 43–58, the same is equally true.

Reverse coding of items 43–58 is required prior to all psychometric testing to render 4 as the desirable score measuring functional health. In clinical practice, after their verse coding of items 43-58, a mean score greater than 3 is suggestive of functional health as defined by Gordon (1994,2008) as well as readiness for health promotion. Refer to appendix 2 of the thesis for the question and Appendix 7 for the scale permission.

3.5.3. Pittsburgh Sleep Assessment Quality Index (PSQI) Scale

The PSQI scale is a self-report questionnaire that assesses sleep quality over a 1-month time interval, was developed by Buysse and his colleagues in 1988, for the purpose of gathering information about the subjective sleep habit of people and also to see how sleep might be associated with sleep disorder (Buyss et.al.1988). It consists of 19 items, creating 7 components that produce one global score and it takes 5-10minutes to complete.

The 7 component score consist of;

- subjective sleep quality.
- sleep latency (i.e., how long it takes to fall asleep).
- sleep duration.
- habitual sleep efficiency (i.e., the percentage of time in bed that one is asleep.
- sleep disturbances.
- use of sleeping medication.
- daytime dysfunction.

Each item is weighed on a 0-3 interval scale, in scoring the PSQI 7 components were derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). High score indicate worse sleep quality and lower scores denote a healthier sleep quality. In the aspect of sub-scale of PSQI, **Subjective sleep quality** is score 9, **Sleep latency** is scored 2 (<15mins=0; 16-30mins=1;31-60mins=2;>60mins=3) + 5a score (if sum

is equal 0=0;1-2=1;3-4=2;5-6=3), **Sleep duration** is scored 4 (>7=0;6-7=1;5-6=2;<5=3), **Sleep efficiency** (total of hours sleep/ total of hours in bed) x 100 >85%=0,75%-84%=1, 65%-74%=2, <65%=3. **Sleep disturbance;** Sum of scores 5b to 5j (0=0;1-9=1;10-18=2;19-27=3). **Use of medication;** is scores 6. **Daytime dysfunction; is** 7score + 8 score (0=0;1-2=1;3-4=2;5-6=3). It gained popularity as a measure that could be used in research that looks at how sleep might be associated with sleep disorders, depression, and bipolar disorder. Refer to appendix 3 of the thesis for the questions and Appendix 8 for the scale permission.

3.6. DATA COLLECTION

The questionnaire form which included the Socio demographic questionnaire, Functional Health Pattern Assessment Screening Test scale and Pittsburgh Sleep Assessment Quality Index scale was compiled as one.

Prior to the distribution of the questionnaires, permissions were taken from lecturers and professors to perform the study data collection through the student feedbacks and permission was also taken from ethical committee. And informed consent was given before distribution. The questionnaires were distributed on June to the international (English-speaking) nursing students of NEU via internet (Facebook, WhatsApp &Instagram).

Information about the aim, instructions and objectives of the questionnaires was provided and the purpose of the study was given. It took about 10-20 minutes to complete each questionnaire. Data collected after 2 weeks was about 30%, messages and emails were sent back to respondent and by the end of the month 50% were successfully gathered and the students were thanked afterwards.

3.7. EVALUATION OF RESEARCH DATA

Research data were statistically analyzed in IBM Statistical Package for Social Sciences (SPSS) 24.0 software. In order to compare the FHPAST and PSQI scores according to the various characteristics of the students, the state of the data's compliance with the normal distribution was first tested with the Kolmogorov-Smirnov, Shapiro-Wilk tests. Accordingly, in comparing the

scale scores of the students' socio-demographic characteristics; If the independent variable is in 2 categories, Mann-Whitney U test, if more than 2 categories, Kruskal-Wallis H test will be used.

3.8. ETHICAL CONSIDERATIONS

In order to conduct the research, permissions were obtained from the Near East University Ethics Committee (YDU/2020/79-1091) (ANNEX-3), App. 5 and the Near East University Faculty of Nursing (ANNEX-4), App.6 in writing. By introducing herself to the students participating in the research, the researcher explained the purpose of the study verbally and in writing and obtained verbal consent from the participants (ANNEX-5).

3.9. LIMITATIONS OF THE STUDY

The data obtained from the results of this research are limited only to students who agree to participate in the research at the Faculty of Nursing of Near East University and cannot be generalized to all nursing students.

FINDINGS

Table 1. Distribution of Some Sociodemographic Characteristics of the Students (n=200)

Variables		N	%
Marital status	**Married**	81	40.50
	Single	**119**	**59.50**
Year in University	**Year 1**	**6**	**3.00**
	Year 2	58	29.00
	Year 3	60	30.00
	Year 4	**76**	**38.00**
Country of origin	Nigeria	59	29.50
	Ghana	**83**	**41.50**
	Zimbabwe	35	17.50
	Gambia	**23**	**11.50**
Age of students	**20yrs & below**	**9**	**4.50**
	21-25yrs	**126**	**63.00**
	26yrs & above	65	32.50
Body mass index((kg/m 2)	**Underweight**	6	3.00
	Normal weight	61	30.50
	Overweight	**111**	**55.50**
	Obese	**22**	**11.00**
General health opinion	**Excellent**	**77**	**38.50**
	Good	72	36.00
	Fair	45	22.50

	Poor	6	3.00

Table 1 represents the distribution of some social demographic data of all respondents. On marital status, 59.50% (n=119) were single and 40.50% (n=81) were married. From the university year groupings, the highest frequency was for the Year 4 group at 38% (n=76) while the lowest frequency was for the Year 1 group 3% (n=6). Most of the student's age with high frequency ranges from 21-25days with 63.00% (n=126) but from 20days &below were 3%(n=6). In terms of origin, most 41.50% (n=83) of the students were from Ghana and very few 11.50% (n=23) students were from Gambia. On the level of body mass index of the students, majority of the students reported that their BMI (overweight) is with the frequency of 55.50% (n=111) but few of them reported 3% (n=6) were underweight. In the general health opinion of the students, most of them were in excellent health with 38.50% (n=77) and few were in poor health with 3% (n=6).

Table 2. Menstrual Pattern and Sleep Characteristics of Students (n=200)

Variables		**n**	**%**
First menstrual bleeding	**10yrs &below**	**10**	**5.00**
	11-13yrs	**115**	**57.50**
	≥14yrs	75	37.50
Gynecological problem	Yes	76	38.00
	No	124	62.00
Types of gyne. problems	**Endometriosis**	**32**	**42.10**
	Ovarian cyst	**16**	**21.10**
	Pelvic inflam. Diseases	28	36.80
Menstrual cycle length	25days & below	60	30.00
	26-28days	**99**	**49.50**
	29days & above	**41**	**20.50**
Frequency of menstruation	Once a month	**109**	**54.50**
	Twice a month	45	22.50
	Interval of 2months	39	19.50
	Interval of 4 months	**7**	**3.50**
Experience of menstrual cramps	**Yes**	**36**	**18.00**
	No	70	35.00
	Sometimes	**94**	**47.00**
Degree of pain (n=164)	Moderate	87	53.00
	Severe	77	47.00
Days of bleeding length	2days	49	24.50

	3days	50	25.00
	4days	**68**	**34.00**
	7days	**33**	**16.50**
Sleep disturbance	**Yes**	**77**	**38.50**
	No	67	33.50
	Sometimes	**56**	**28.00**
Sleep interruption	**Yes**	**84**	**42.00**
	No	60	30.00
	Sometimes	**56**	**28.00**
Days of sleep interruption (n=140)	**1st day**	**69**	**49.30**
	2nd day	53	37.90
	3rd day	**18**	**12.90**

The distribution of Menstrual pattern and sleep characteristics of the students is shown in Table 2. Menarche of the students from 11-13 yrs has the highest frequency with 57.50% (n=115) and low frequency from 10yrs & below with 5% (n=10). In terms of gynecological problems, majority of the students does not have problem with a frequency 62.00% (n=124) and few has it with 38.00% (n=76). For types of gynecological problems frequency with 42.10% (n=32) has endometriosis and few with 21.10% (n=16) have ovarian cyst. Most of the student's menstrual cycle length were 26-28days with 49.50% (n=99) and students with 29days and above were 20.50% (n=41).

Most of the student menstruate once a month with high frequency of 54.50% (n=109) and about 3.50% (n=7) low frequency menstruate an interval of four months. In the aspect of day student menstruate 4days has high frequency of 34.00% (n=68) and 7days with low frequency of 16.50% (n=33).

Some of the student experience menstrual cramps sometimes with the frequency of 47.00% (n=94) and low frequency of 18.00% (n=36) has no experience of menstrual cramps. Students experience moderate pain threshold during menstruation with the frequency of 53.00% (n=87) and severe pain threshold with the frequency of 47.00% (n=77). Student have sleep disturbance during menstruation with high frequency of 38.50% (n=77) and sometimes with frequency 28.00% (n=56). The student's sleep was interrupted with high frequency of 42.00% (n=84) and sometimes

with frequency of 28.00% (n=56). Student's sleep was interrupted on the 1st day with a frequency of 49.30% (n=69) and on the 3rd day with a frequency of 12.90% (n=18).

Table 3. Marital status and Degree of Pain Comparison of the Students

		Degree of pain experience during menstruation				
		Moderate		Severe		
		N	%	n	%	X^2, p
Marital status	Married	37	53.60	32	46.40	
	Single	50	52.60	45	47.40	
Total		87	53.00	77	47.00	0.016, 0.900

Table 3. shows the comparison between marital status and degree of menstrual pain of the students, married individuals who experienced moderate pain are 53.60%, n=37 and 46.40%, n=32 experienced severe pain. Among single respondents, 52.60%, n=50 had moderate pain while 47.4%, n=45 experienced severe pain. Marital status doesn't statistically impact on the degree of mesntrual pain.(p>0.05).

Table 4 Functional Health Pattern Assessment Screening Tool Scale Point Distribution

Scale	Normal min-max	Study min	Study max	Mean±SD

1-4	115.00	176.00	142.2915±10.33556

Table 4, shows the functional health pattern assessment screening tool scale point distribution. In this table, the study min is 115.00 and max is 176.00 and the Mean±SD are 142.2915±10.33556 respectively.

Table 5. Comparison of Country of Origin of Students with Functional Health Pattern Assessment Screening Tool (n=200)

	Nigeria (n=59)	Ghana (n=83)	Zimbabwe (n=35)	Gambia (n=23)		
Scale Score	Mean±SD	Mean±SD	Mean±SD	Mean±SD	X^2	p
Total scale	**143.52±11.65**	142.82±9.16	**139.40±8.72**	141.69±12.69	3.965	0.265
Health risk	**39.07±7.74**	41.17±5.94	**41.89±4.15**	42.00±9.39	2.158	0.540
General well being	**70.67±9.01**	69.28±7.29	**65.94±6.71**	66.69±6.32	7.910	**0.048**
Health promotion	**33.78±3.92**	32.37±4.13	**31.57±3.88**	33.00±4.65	7.146	0.067

Table 5 shows the comparison of functional health scale and country of origin of students. In this table the highest total score is in Nigeria participant (Mean±SD; 143.52±11.65) and low total score is in Zimbabwe participant; (**139.40±8.72)** and there is no difference between total score and origin of the students (X^2 = 3.965; p= 0.265). ln this scale there is 3 sub-scale health risk, general well-being, health promotion, hence there is no statistical difference related to country of origin of

participant but the students from Zimbabwe have a low health promotion subscale (**31.57±3.88),** General well-being subscale (**65.94±6.71**). However, it can be observed that the p-value of the general health wellbeing (p=0.048) which means there is a statistical significance relative to nationality in the general well-being domain. A post hoc analysis indicated that the mean and standard deviation (Mean±SD) of students are as follows; students from Nigeria (**143.52±11.65**) have the highest functional health index and the nation with least functional health score was individuals from Zimbabwe **(139.40±8.72).**

Table. 6. Comparison of Menstrual Frequency of Students with Functional Health Pattern Assessment Screening Tool (n=200)

Scale Score	Once a month (n=109)	Twice a month (n=45)	Interval of two months(n=39)	Interval of four months (n=7)	X^2	p
	Mean±SD	**Mean±SD**	**Mean±SD**	**Mean±SD**		
Total Scale	**143.64±10.37**	**140.29±9.39**	140.95±11.01	141.29±10.77	2.867	0.413
Health Risk	40.79±7.37	**41.22±4.57**	40.33±7.29	**40.29±6.94**	0.144	0.986
General Wellbeing	69.75±8.84	67.52±6.22	**68.28±6.37**	**64.86±3.67**	4.034	0.258
Health Promotion	33.10±3.96	**31.55±4.22**	32.33±4.24	**36.14±3.53**	8.234	**0.041**

Table 6 shows the comparison of functional health scale and frequency of menstruation. It can be deduced from the table above that the total scale with the highest is once a month (Mean±SD; **143.64±10.37**) and the lowest twice a month (**140.29±9.39),** which was ascertain using the post-hoc analysis. Students with menstrual frequency of interval of 4 months have the lowest subscale of health risk (**40.29±6.94) and** general well-being **(64.86±3.67).** However, there is a significant difference in the health promotion sub-scale(p<0.05).

Table 7 Comparison of Days of Menstrual Bleeding of Students with Functional Health Pattern Assessment Screening Tool (n=200)

Scale Score	2 days (n=49)	3 days (n=50)	4 days (n=68)	7days (n=33)		
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	X^2	p
Total Scale	141.13±10.52	**144.24±11.92**	142.93±9.21	**139.72±9.33**	2.426	0.489
Health Risk	40.42±6.56	**42.74±7.27**	**39.29±7.01**	41.39±5.08	4.292	0.232
General Wellbeing	67.77±8.98	68.70±7.73	**70.87±7.52**	**66.76±5.52**	10.486	**0.015**
Health Promotion	33.33±3.99	**32.80±4.10**	32.76±4.18	**31.58±4.23**	2.490	0.479

Table 7 shows the compares between Functional health scale and menstrual bleeding days of students. It can be deduced from the table above that the total scale with the highest score is 3days (Mean±SD; **144.24±11.92) and** the lowest is 7days (**139.72±9.33),** which was deducted using the post-hoc analysis. In the scale, it is made up of 3 subscales namely; health risk, general well-being and health promotion. Students with 4days of menstrual cycle have the lowest subscale of health risk (**39.29±7.01)** and those in 7days have general well-being **(66.76±5.52)** and health promotion of (**31.58±4.23**) However, there is a significant difference in the general wellbeing sub-scale($p<0.05$) and both the health risk and health promotion $p>0.05$, which means there is no statistical significance.

Table 8. Comparison of Degree of Pain Characteristics of Students with Functional Health Pattern Assessment Screening Tool (n=164).

Scale Score	Moderate (n=87) Mean±SD	Severe (n=77) Mean±SD	U^2	P
Total Scale	**141.63 ±9.61**	**143.47±11.49**	3087.500	0.467
Health Risk	**41.17±5.52**	40.08±6.71	3097.500	0.406
General wellbeing	**68.59±7.42**	69.24±8.29	3253.00	0.860
Health promotion	31.86±3.99	**34.16±4.49**	2501.500	**0.005**

Table 8. shows Functional health scale and degree of pain characteristic of students**.** It can be deduced from the table above that the total score with the highest functional health score is student with severe menstrual pain (Mean±SD;**143.47±11.49)** and the lowest with moderate pain (**141.63±9.61)** which was ascertain by the use of post-hoc analysis. However, there is a significant difference in the health promotion sub-scale(p<0.05).

Table 9 Comparison of Sleep Interruption of the Students with Functional Health Pattern Assessment Screening Tool (n=200).

Scale Score	No (n=60) Mean±SD	Yes(n=84) Mean±SD	Sometimes(n=56) Mean±SD	X^2	p
Total Scale	**142.39±10.47**	142.27±10.23	**142.21±10.53**	0.101	0.951
Health Risks	**38.83±7.81**	40.95±6.61	**42.57±5.26**	9.006	**0.011**
General Wellbeing	**70.00±9.28**	68.86±6.50	**67.45±7.77**	1.360	0.507
Health promotion	**33.56±4.86**	32.46±3.85	**32.19±3.62**	1.144	0.564

Table 9. shows functional health scale comparison to sleep interruption of the students. It can be deduced from the table 7 above that A post-hoc analysis indicated that students that experience sleep interruption sometimes (Mean±SD; **142.21±10.53)** has the highest functional health score while those that indicated No **(142.39±10.47)** have the least functional health score. In health risk, the student with sometimes sleep interruption has the highest sub-scale of **(42.57±5.26)** and the lowest in both general well-being and health promotion respectively (**67.45±7.77 & 32.19±3.62**). The students with No sleep disturbance has the lowest health risk **(38.83±7.81)**, and the highest in both general well-being and health promotion respectively (**70.00±9.28 & 33.56±4.86**). There is no statistically significant difference relative to sleep interruption in the p-values of the total scale and the sub-scales of general wellbeing and health promotion (p>0.05). However, there is a significant difference in the health risk sub-scale(p<0.05).

Table 10. Pittsburg sleep Quality Index Scale Point Distribution

Scale	Normal min-max	Study min	Study max	Mean±SD
	0-21	6.00	19.00	11.53±2.39

Table 10, shows the sleep quality index scale distribution point, where the study min and maximum are 6.00 and 19.00 respectively and the Mean±SD are 11.53±2.39. which shows that the study minimum denotes a healthier sleep quality and maximum denotes poor sleep quality.

Table 11. Comparison of Marital Status of the Students with the Pittsburg Sleep Quality Index (n=200)

A test of normality was conducted on the Pittsburg sleep quality scale and it was not normally distributed. Therefore, the Mann-Whitney test(U) and Kruska-Wallis test(Xkw) were used for variables comparisons.

	Married (n=81)	Single (n=119)	U^2	
Scale Score	Mean±SD	Mean±SD		p
Total Scale	10.87±2.17	11.88±2.48	3341.000	**0.003**
Subjective sleep quality	2.05±0.89	2.16±0.95	4588.000	0.545
Sleep latency	1.80±0.63	1.86±0.65	4665.500	0.667
Sleep duration	0.25±0.64	0.52±0.83	3960.000	**0.005**

	0.79±1.17	1.10±1.22	4249.500	0.124
Sleep efficiency				
Sleep disturbance	2.18±0.45	2.21±0.43	4804.000	0.959
Use of sleep medication	1.87 ±0.85	2.00±0.85	4529.000	0.444
Daytime dysfunction	1.92±0.86	2.01±0.86	4583.500	0.533

The table 11 above shows Sleep quality scale comparison to marital status of the Students. It indicates that the total score with the highest sleep quality is the single student **(**Mean±SD**;11.88±2.48)** and the lowest is the married students (**10.87±2.17),** it indicated that there is a statistically significance relative to marital status (p<0.05). This revealed that singles have a higher score in the Pittsburg sleep quality index than married students. There are no statistical significance differences in the subjective sleep quality, sleep latency, sleep efficiency, sleep disturbance, use of sleep medication and daytime dysfunction sub-scales relative to marital status (p>0.05).

Table 12. Comparison of Experience of Menstrual Cramps of the Students with the Pittsburg Sleep Quality Index (n=200)

Scale Score	No (n=36) Mean±SD	Yes (n=70) Mean±SD	Sometimes(n=94) Mean±SD	X^2	p
Total Scale	**10.49±2.48**	**11.84±2.28**	11.61±2.39	6.351	**0.042**
Subjective sleep quality	1.97±0.95	**2.19±0.96**	2.12±0.89	1.857	0.395
Sleep latency	1.80±0.72	**1.88±0.69**	1.83±0.59	0.197	0.906
Sleep duration	0.23±0.55	**0.52±0.82**	0.40±0.79	3.141	0.208
Sleep efficiency	0.60±1.11	**1.16±1.23**	0.99±1.21	6.335	**0.042**
Sleep disturbance	2.17±0.38	2.21±0.45	**2.21±0.46**	0.213	0.899
Use of sleep medication	1.74±0.78	1.94±0.81	**2.04±0.90**	2.728	0.256

Daytime dysfunction	1.97±0.92	1.93±0.89	**2.02±0.81**		0.593	0.743

Table 12 shows the sleep quality scale comparison to menstrual cramps of the students. The total score indicates that students with Yes menstrual cramp has the highest (Mean±SD**;11.84±2.28),** and the lowest is No (**10.49±2.48),** as ascertain by a post-hoc analysis. It is indicated that there is a statistically significance relative to the experience of menstrual cramp in the named scales (sleep efficiency $p<0.05$). Meanwhile, it is concluded that there are no statistical significance differences in the subjective sleep quality, sleep latency, sleep duration, sleep disturbance, use of medication and daytime dysfunction sub-scales relative to the experience of menstrual cramp ($p>0.05$).

Table.13. Comparison of General State of Health Opinion of the Students with the Pittsburgh **Sleep Quality Index (n=200)**

Scale Score	Excellent (n=77) Mean±SD	Good (n=72) Mean±SD	Fair (n=45) Mean±SD	Poor (n=6) Mean±SD	X^2	p
Total Scale	**11.80±2.62**	11.34±2.43	11.27±2.02	**10.67±1.86**	2.199	0.532
Subjective sleep quality	2.21±1.01	**1.97±1.01**	2.14±0.88	**2.50±0.84**	4.364	0.225
Sleep latency	1.82±0.66	**1.74±0.64**	**2.02±0.59**	2.00±0.63	6.283	0.098
Sleep duration	0.41±0.82	**0.56±0.78**	**0.25±0.69**		9.453	**0.024**
Sleep efficiency	**1.13±1.22**	**1.06±1.21**	0.70±1.19	0.17±0.41	8.182	**0.042**
Sleep disturbance	**2.22±0.45**	2.19±0.47	2.18±0.39	**2.17±0.41**	0.154	0.985
Use of sleep medication	**2.00±0.88**	1.94±0.89	1.95±0.78	**1.50±0.55**	1.976	0.577
Daytime dysfunction	2.01±0.90	**1.88±0.78**	2.02±0.88	**2.33±1.03**	1.584	0.663

Table 13 represent the sleep quality scale comparison to the general health opinion of the students. The total scale with the highest sleep quality score is students in Excellent health (Mean±SD**;11.80±2.62),** and the lowest is students in Poor health (**10.67±1.86).** A post-hoc analysis revealed that individuals with good health have the highest score in the sleep duration sub-scale (**0.56±0.78),** while students with excellent health have the highest score in the sleep efficiency domain (**1.13±1.22**). The p-values of the sleep duration and the sleep efficiency sub-scales (**p<0,05)** respectively, it indicated that there is a statistically significance relative to the state of quality of health in these aforementioned sub-scales. However, there are no statistical significance differences in these mentioned domains relative to general state of health of the students; the total scale, subjective sleep quality, sleep latency, sleep disturbance, use of medication and daytime dysfunction (p>0.05).

Table. 14. Comparison Menarche of the Students with the Pittsburgh Sleep Quality Index (n=200)

Scale Score	10yrs&below (n=10) Mean±SD	11-13 yrs. (n=115) Mean±SD	14 yrs &above (n=75) Mean±SD	X^2	p
Total Scale	**10.60±2.01**	**11.68±2.57**	11.32±2.17	2.782	0.249
Subjective sleep quality	2.10±0.99	**2.01±0.91**	**2.27±0.93**	3.008	0.222
Sleep latency	**2.20±0.63**	**1.79±0.63**	1.86±0.65	3.488	0.175
Sleep duration	**0.01±0.01**	**0.53±0.86**	0.29±0.63	7.118	**0.028**
Sleep efficiency	**0.70±1.06**	1.09±1.27	**0.84±1.11**	2.054	0.358
Sleep disturbance	2.20±0.42	**2.23±0.48**	**2.16±0.37**	1.084	0.582
Use of sleep medication	**1.80±0.79**	**1.98±0.83**	1.93±0.90	0.502	0.778
Daytime dysfunction	**1.60±1.07**	**2.03±0.86**	1.95±0.82	3.435	0.180

Table 14 shows the sleep quality scale comparison to Menarche of students. The total scale with the highest sleep quality score is student with menarche at 11-13years (Mean±SD**;11.68±2.57),**

and the lowest is 10years & below (**10.60±2.01**). However, there is no statistically significant difference relative to menarche of students in this mentioned domain; the total scale and all the sub-scales namely subjective sleep quality, sleep latency, sleep efficiency, sleep disturbance, use of sleep medication and daytime dysfunction, (p>0.05). Meanwhile, in the sleep duration sub-scale, (p<0.05, $X^*=7.118$) which signify that there is a statistical significance relative to menarche is this domain.

Table 15. Comparison of the Menstrual Cycle Length of the Students with the Pittsburgh Sleep Quality Index (n=200)

Scale Score	25 days&below (n= 60) Mean±SD	26 – 28 days (n=99) Mean±SD	29days&above (n=41) Mean±SD	X^2	P
Total Scale	**11.02±1.87**	**11.72±2.76**	11.29±2.11	2.628	0.269
Subjective sleep quality	2.09±0.94	**2.15±0.89**	**2.08±1.02**	0.476	0.788
Sleep latency	1.78±0.53	**1.76±0.69**	**2.13±0.61**	11.503	**0.003**
Sleep duration	0.21±0.55	**0.57±0.88**	**0.33±0.70**	8.834	**0.012**
Sleep efficiency	0.93±1.19	**1.05±1.23**	**0.87±1.19**	0.755	0.685
Sleep disturbance	2.22±0.46	**2.16±0.43**	**2.26±0.44**	2.708	0.274
Use of sleep medication	**1.81±0.76**	**2.02±0.91**	2.00±0.83	2.592	0.274
Daytime dysfunction	1.98±0.87	**2.00±0.98**	**1.92±0.98**	0.409	0.815

Table 15 shows sleep quality scale comparison to Menstrual cycle length of the students. The total scale of sleep quality score with the highest score is 26-28days of menstrual bleeding length (Mean±SD**;11.72±2.76)** and the lowest is 25days & below (**11.02±1.87).** A post-hoc analysis revealed that individuals with 29 days & above menstrual cycle have the highest score in the sleep latency sub-scale (**2.13±0.61**) while those with 26-28 days of menstrual cycle length have the highest score (**0.57±0.88**) in the sleep duration domain. Since the p-values of the sleep latency and

the sleep duration (p=**0.003 &0.012 and X*=11.503&8.834**) respectively are p<0.05, it indicated that there is a statistically significance relative to the length of menstrual cycle in these aforementioned sub-scales. However, there are no statistical significance differences in these mentioned domains relative to length of menstrual cycle; the total scale, subjective sleep quality, sleep disturbance, sleep efficiency, use of medication and daytime dysfunction (p>0.05).

Table 16. Comparison Menstrual Frequency of the Students with the Pittsburgh Sleep Quality Index (n=200)

Scale Score	Once a month (n=109) Mean±SD	Twice a month (n=45) Mean±SD	Interval of two months(n=39) Mean±SD	Interval of four months (n=7) Mean±SD	X^2	P
Total Scale	11.63±2.59	11.30±2.09	**11.16±2.19**	**12.14±2.73**	1.623	0.654
Subjective sleep quality	2.10±0.91	**2.00±0.91**	2.26±0.86	**2.28±1.38**	1.056	0.788
Sleep latency	1.81±0.68	**1.81±0.55**	1.87±0.66	**2.29±0.49**	4.115	0.249
Sleep duration	0.50±0.85	0.28±0.59	**0.26±0.55**	**0.71±1.25**	3.005	0.391
Sleep efficiency	**1.01±1.21**	1.16±1.21	0.55±0.98	**1.57±1.39**	7.215	0.065
Sleep disturbance	**2.18±0.41**	2.19±0.50	**2.26±0.45**	2.29±0.49	1.614	0.656
Use of sleep medication	**2.13±0.86**	1.74±0.82	1.76±0.75	**1.57±0.98**	11.567	**0.009**
Daytime dysfunction	1.89±0.81	2.11±0.91	**2.18±0.93**	**1.43±0.53**	7.372	0.061

Table 16 shows sleep quality scale comparison to menstrual frequency of the students. The total scale of the sleep quality score with the highest score is interval of 4months (Mean±SD**;12.14±2.73)** and the lowest id interval of 2months (**11.16±2.19).** A post-hoc analysis

revealed that individuals with once a month cycle have the highest score (**2.13±0.86**) in the use of medication sub-scale while those with interval of 7 months have the lowest score (**1.57±0.98).** Since the p-values of the use of medication sub-scale (p<0,05**, Xkw*=11.567)**, it indicated that there is a statistically significance relative to the frequency of menstrual cycle in the named sub-scale. However, there are no statistical significance differences in these mentioned domains relative to frequency of menstrual cycle; the total scale, subjective sleep quality, sleep latency, sleep disturbance, sleep duration, sleep efficiency, and daytime dysfunction (p>0.05).

Table 17. Comparison of Body Mass Index of the Students with the Pittsburgh Sleep Quality Index (n=200)

Scale Score	Underweight (n=6)	Normal Weight (n=61)	Overweight (n=111)	Obese (n=22)	X*	p**
	Mean±SD	**Mean±SD**	**Mean±SD**	**Mean±SD**		
Total Scale	**10.00±1.22**	**11.83±2.42**	11.46±2.37	11.00±2.67	5.697	0.127
Subjective sleep quality	**1.80±0.45**	**2.30±0.87**	2.06±0.95	2.00±1.02	4.803	0.187
Sleep latency		**1.80±0.63**	**1.91±0.65**	1.82±0.59	13.100	**0.004**
Sleep duration	0.40±0.55	**0.55±0.81**	0.36±0.76	**0.27±0.77**	5.388	0.146
Sleep efficiency	**1.60±1.14**	1.13±1.19	0.89±1.21	**0.82±1.22**	4.873	0.181
Sleep disturbance	**1.80±0.45**	2.13±0.34	**2.25±0.48**	2.23±0.43	8.106	**0.044**
Use of sleep medication	**1.60±0.55**	**2.03±0.92**	1.93±0.84	1.95±0.79	0.341	0.952
Daytime dysfunction	**1.80±0.84**	1.88±0.72	**2.06±0.93**	1.91±0.87	1.325	0.723

Table 17 shows sleep quality scale comparison to Body mass index of the Students (BMI). The total scale of sleep quality index highest score is Normal weight (Mean±SD**;11.83±2.42)**, and the lowest is Underweight (**10.00±1.22).** in the subscale subjective sleep quality, normal weight highest (**2.30±0.87**) while under weight is lowest (**1.80±0.45**), Since the p-values of the sleep latency and the sleep disturbance (p=**0.004 &0.044, Xkw*=13.100&8.106**) are p<0.05, it indicated that there is a statistically significance relative to body mass index (bmi) in these aforementioned sub-scales. A post-hoc analysis revealed that individuals that are overweight have the highest score in the sleep latency sub-scale (**1.91±0.65**) while they also have the highest score in the sleep disturbance (**2.25±0.48**) domain. However, there are no statistical significance differences in these mentioned domains relative to body mass index; the total scale, subjective sleep quality, sleep duration, sleep efficiency, use of medication and daytime dysfunction, (p>0.05).

CHAPTER FIVE

DISCUSSION

The purpose of this study is to know the relationship between functional health and sleep quality among university female study during their menstrual cycle. Female sleep quality differs within the female gender and with men due to the fluctuation of female sex hormone (estrogen and progesterone) throughout their reproductive life from menarche (first menstruation) to menopause (Buysse, 2014), Some research shows that the quality of sleep and the time spent in sleep is directly linked to the phases of menstrual cycle, in spite of all this, it is important for a human being to get the recommended 7-8 hours of sleep every night (Grady-Weliky TA. 2003). Change in lifestyle like simple carbohydrate diet, effective stress management measures like yoga and massage are helpful. Even though not enough research has been done among the target audience (university females), it's crystal clear that psychological and physical changes before and during the menstruation influence their daily life (Pamela 2009).

5.1. Findings from the Demographic Distribution of the Students

According to WHO 1986, quotes that there seems to be a relationship between BMI and onset of menarche and maintaining a healthy menstruation. In the socio demographic characteristics of this study, Table 1 indicate that single students have the highest percentage about 59.50% (n=119) than married students. As shown on the education section of the Table 1, majority 38% (n=76) of the students were in their fourth academic year in the university, the lowest percentage of students 3% (n=6). This is normal as the main focal students of this study are international students (non-indigenes/citizens; individual that migrate to another country other than their own, for the purpose of education). Additionally, majority of the students were from

53

Ghana 41.50% (n=83), and with the age ranges from 21-25yrs 63% (n=126), with a body mass index of about 55.50% (n=111) and the student's general health opinion were excellent 38.50% (n=77).

5.2. Findings on Menstrual Pattern and Sleep Characteristics of the Students

According to Edward-Elmhurst Health (2020), during lifetime, menstrual cycle and periods change and evolve due to age-related hormonal changes and other factors such as stress, lifestyle, medications and certain medical conditions.

According to a cross-sectional descriptive study by Dambhare et. al. (2012), on Age at Menarche and Menstrual cycle pattern among school Adolescent girls in central India (n=1100). Data was collected using a self-administered structured questionnaire on menstruation. Mean ages of menarche were 13.51 + 1.04 years and 13.67 + 0.8 years for urban and rural areas respectively. At the end of the study, there was lack of information regarding menstrual cycle length, duration of menses and age at menarche and the mean age of menarche were higher in girl who are involved in sport activity. The age at menarche was delayed and menstrual disorders among females were common. In Table 2, Menarche of the student started at the age 11-13 yrs. health education on menstrual problems targeting adolescent girls and their parents and routine screening for menstrual problems by healthcare providers can help to prevent the absenteeism in the school.

In the aspect of gynecological problems about 62% of the student does not have any problem, according to National Women's Health Network (2020), people with endometriosis experience pain when the tissue that lines the uterus get trapped outside of it, endometriosis has an impact on menstrual cycle length and days of bleeding and menstruation tends to be shorter and menstruation begins shorter than 28days. majority of the students have endometriosis and with menstrual cycle length between 26-28days 49.50% (n=99) and also menstruate once a month 54% (n=109). According to Wilson (2020), painful menstruation is also called dysmenorrhea and there are two types; primary dysmenorrhea (occurs before and during menstruation), Secondary

dysmenorrhea is as result of pain that occurs later in life which might be as a result of endometriosis or fibroid.

Causes of menstrual cramps/pain is caused by the hormone (prostaglandin) which triggers contraction of the muscles lining the uterus thereby causing pain due to the contraction and this hormone rises before and during menstruation. Concurrently, about 47% (n=94) of the students have menstrual cramps Sometimes and degree of pain is on the moderate side about 53% (n=87). Pain can be reduced by taking a warm bath and warm drink, heat compress on the pelvic region, practicing relaxation exercise and yoga.

Additionally, in the aspect of Days of menstrual bleeding of the students, majority bled for 4days about 34% (n=68), Sleep Health Foundation (2011), propose that about 7 in 10 women have change in sleep before menstruation and it is mostly common from 3-6 days before menstruation. During menstruation there is sudden drop of progesterone which affect temperature and also sleep quality. Majority of the students tend to have sleep disturbance about 38.50% (n=77) and sleep interruption Yes 42% (n=84), sleep interruptions happens majority on the 1st day of menstruation about 49.50% (n=69). To reduce sleep disturbance and interruption avoid alcohol and caffeinated drinks, eat more food rich in calcium. Table 3 shows that there is no difference in the aspect of pain related to marital status of the students (p>0.05). Students who are single might have pain which might be as a result of psychological well-being.

5.3. Finding on the Comparison between FHPAST and Some socio-demographic, Menstrual Characteristics and Sleep characteristics of the Students

According to Dr. Reed Kerrie, (2010-2020), defined functional health as optimizing one's ability to do activities that one needs to do and wants to do without any hindrance by physical injuries or pain and also it is a mechanical well-being about one's muscles, bones, joints, nerves, and everything else that's responsible for one's physical ability to move. A study carried out by L. Bernstein et al (1987) on effect of moderate physical activity on menstrual cycle pattern on adolescence: implications for breast cancer prevention. Questionnaire, the biweekly menstrual calendar, physical activity calendar was used for data collections.

At the end of their study it was discovered that participant who engaged in moderate physical exercise experience remarkably short menstrual cycle and the magnitude of the effect of this physical activity on average menstrual cycle length was similar to both ovulatory and anovulatory girls. Meanwhile, these results were not statistically significant in the subgroup

55

analyses and this observation propose a link in moderate physical activity with luteal phase insufficiency as well as with anovulation.

In Table 4, if the response is rated 1 or 2 for items 1–42, it is a predictor of a potential problem or risk within one or more of the applicable FHPs. If the response is 3 or 4 for items 43–58, the same is equally true. The study Mean±SD (143.29±10.33), min (115.00), max (176.00). According to table 5, Country of origin of students and FHPAST, there is a difference in the FHPAST sub-scale (p<0.05), which means that there is tendency of being physically fit depending where the student is from.

According to a descriptive cross-sectional study by Pitangui et. al. (2012), on menstrual cycle disturbance: prevalence, characteristics and its effects on activities of daily living am adolescent girls from Brazil (n=218). A structured questionnaire and menstrual characteristics of the participant were used. At the end of the study about 67% of the student's menstrual frequency were regular while about 33% were irregular. There is a significant difference between frequency of menstruation and FHPAST, in the health promotion sub-scale (X^2=8.234, p<0.05) (table 6), this signifies that the frequency of menstruation of each students determines her activities of daily living.

According to a study by Lukes AS et. al. (2012) on daily menstrual blood loss and quality of life in women with heavy menstrual bleeding and it is a randomized, double-blind, placebo-controlled, parallel-group. Daily Menstrual blood loss and Menorrhagia Impact Questionnaire scores were evaluated for two pre-treatment cycles and first three tranexamic acid treatment group. At the end of the study, the highest menstrual blood loss occurred on the 2nd and 3rd day of menstruation and due to the blood loss physical and social activities were limited. Concurrently, table 7 signifies that there is a difference between days of bleeding of the students and FHPAST, in the general wellbeing sub-scale (X^2=10.468, p<0.05), which shows that the days which the students bleeds determines the well-being of the students.

According to a study by Armour et. al, (2019), on the effectiveness of self-care and lifestyle intervention in menstrual pain: a systematic review and meta-analysis (n=2302) women. For the evaluation of this survey the following were used; Visual Analogue Scale, Composite Scale or Symptoms Score, Menstrual pain duration, Analgesic usage and Absenteeism etc. were used. And the following were used as intervention purposes; exercise, acupressure and heat compress. At the end of the study, heat compress and exercise were more effective than analgesics, which enables

the individuals to carry-out activities of daily living normally. There is a difference between degree of pain during menstruation and FHPAST, in the health promotion sub-scale (U^2=2501.500, p=0.005) (table 8),

It is evident that menstrual pain, is a relevant public health issue because they have a negative effect on female students' activities of daily living and school performance and social activities. Furthermore, a large part of students, their relatives, and healthcare professionals undermine these disorders. Therefore, it is believed that knowledge and an early diagnosis of menstrual disturbances are essential, because the importance of implementing health education actions, they also help in choosing appropriate treatments, thus minimizing the negative outcomes caused by these disorders in the lives of peoples.

Majority of the students with sleep interruption falls under Sometimes, there is a difference between students sleep interruption during menstruation and FHPAST health risk sub-scale (X^2=9.006, p<0.05) (table 9), it means that student with sleep interruption tends to have low functional activity of daily living. Sleep quality changes occur during the menstrual cycle, poorer sleep quality in the premenstrual phase and menstruation is common in women with premenstrual symptoms or painful menstrual cramps. (ncbi.nlm.nih.gov 2020).

Another cohort study by Ahrens, et al (2014) on effect of physical activity across the menstrual cycle on reproductive function. This study was carried out using international physical activity questionnaire (IPAQ). At the end of the study, they discovered that High past-week PA was inversely associated with leptin [−6.6%, 95% confidence interval [−10.6, −2.5] and luteal phase progesterone (−22.1% [−36.2, −4.7] as compared with low past-week PA. High past-week PA was not significantly associated with sporadic anovulation (adjusted risk ratio=1.5 [0.6, 3.4]. And also that moderate to highly active premenopausal women, Physical activity did not appear to substantially change hormone levels during the menstrual cycle or significantly affect the risk of sporadic anovulation. These findings therefor propose that Physical activity may not adversely affect fecundability and further reinforce the beneficial effect of PA on women's health.

5.4. Findings on the Comparison between PSQI and Some socio-demographic, Menstrual Characteristics of the Students

Sleep quality has been studied among university students and such studies have shown impairments in sleep quality which are more in students who are medically inclined like nurses,

doctors and others, due to their heavy academic schedules and responsibilities which in its way affect their sleep quality (Benavente SB et al &Lemme S et al 2014, Preišegolavičiūtė E et al 2010, Pagnin D et al 2014 & Cardoso HC et al 2009).

In this study, the normal range of PSQI ranges from 0-21, where lower score denotes healthier sleep quality, the study Mean±SD (11.53±2.39), min is (6.00) and the max (19.00), which indicated that there is poor quality of sleep among the students which calls for audience/awareness (table 10).

As reported by Troxel. et. al. (2010), a longitudinal, observational study of women on the examination of the association between marital/cohabitation status and in relation to sleep quality in a multi-ethnic sample of mid-life women (Caucasians n=170, African American n=138, Chinese women n=59), (n=367) PSQI, polysomnography and Acti-graphy were used for the evaluation of these people. At the end of the study, there were significant group differences in PSQI scores according to marital status (p<0.001), a follow-up linear regression model was done and it shows that married people have significant good sleep quality compared to the single people. Marital status and PSQI, there is a difference in both PSQI total scale (U^2=3341.00, p<0.005). and sub-scale sleep duration (U^2=3960.00, p<0.05) (table 11), Which shows that there is high tendency of married women having good sleep quality which might be due to frequent sexual intercourse compared to the single ones.

As reported by Kirmizigil et. al. (2020), on the effectiveness of functional exercise on pain and sleep quality in people with menstrual cramps: a randomized clinical trial/ controlled study (n=28), PSQI and Menstrual Symptom Questionnaire were used for evaluations of this participant's sleep quality and menstrual symptoms while the Visual Analogue Scale was used for evaluation of pain intensity of this participant. These participants were engaged in a combined exercise during the survey. At the end of the study, the exercise group reveals that abdominal pain and menstrual symptoms questionnaire and PSQI scores were significantly different after 8-weeks exercise program (p<0.05) and also that combined exercise is an effective way to relieve menstrual cramps. Majority of the students with menstrual cramps falls under Sometimes, then in respect to the PSQI the highest total scale score falls under student with Yes menstrual cramps (X^2=6.335, p=0.042) (table 12). The deterioration of the sleep quality of students who experience cramps in the menstrual period may affect both their daily activities and their school life, so health education about sleep quality during menstruation is important and how to relieve menstrual cramps during

menstruation by doing mild exercise; yoga and by drinking less sugary things and eat more fruits and vegetables and use hot packs to place on the abdomen and drink hot tea.

According to National Library of Medicine, Biotech Information: Baker, F. C et. al. (2012), people with PMS often have sleeping problems and will likely experience insomnia before and during menstruation and which will cause excessive sleep during the day- time, feeling drowsy and tired during menstruation and which in turn affect general health of the individual or students by reducing sleep duration and how well the students sleep. Additionally, table 13 signifies that there is a difference between the general health opinion of the students and PSQI, in the p-values of the sleep duration (X^2=9.453, p<0.05) and the sleep efficiency (X^2=8.182, p<0.05) sub-scales respectively. Which concludes that the sleep quality of the students determines the general health of the students.

According to an ongoing longitudinal study by Lui et. al. (2017), on early menarche and menstrual problems associated with sleep disturbance in a large sample of Chinese adolescent girls (n=5800), aged 12-18 years and this study examines sleep quality in relation to menarche, PSQI and a structured questionnaire were used for evaluation of this study. At the end of the study, menarche ≤11 years was associated with insomnia symptoms (poor sleep quality) in 12-14 years old students and they study also concludes that early menarche might have a brief effect on sleep quality in adolescent girls. There is a difference in the aspect of menarche of the students and PSQI (sub-scale: sleep duration) (X^2=**7.**118, p<0.05) (table 14). And it shows that the age at which students starts menstruation determines her sleep duration.

According to a study by Komada et. al (2019), on subjective sleep disturbance and psychological distress and menstrual symptoms and cycles: (n=150) students were used and PSQI, the Menstrual Distress Questionnaire (mMDQ), and Kessler's Psychological Distress Scale (K6) and also demographic characteristics were used for data collections anonymously. At the end of the study, poor sleep quality students tend to experience severe menstrual symptoms (p<0.01) and also have more variable menstrual cycle length (p=0.06) and less regular menstruation than those with good sleep quality and the subjective sleep disturbance in daily life is associated with menstrual cycle irregularities. Table 15 shows that there is a difference between menstrual cycle length of the students and PSQI sub-scale sleep latency (X^2=11.503, p<0.05) and the sleep duration (X^2=8.834, p<0.05), and this shows that the length at which the students menstruate affect their sleep duration and the amount of sleep the get at night so talk about good sleep quality should be

given to the students to enable them have a sound sleep.

According to an observational cross-sectional study by Karl et. al. (200/2015), on sleep quality during different phases of menstrual cycle of medical students (n=75), the PSQI questionnaire for two calendar months which matches with two month menstrual cycles of the students was used for evaluation. At the end of the study, about 60% had good sleep quality but about 40% had bad sleep quality during their follicular phase and about 30.67% had a good sleep quality and 69.33% had bad sleep quality during the luteal phase. There is a difference between menstrual cycle frequency and PSQI the p-values sub-scale of the use of medication sub-scale (p<0,05, X^2=11.567) (table 16). Which concludes that the phases of menstrual cycle affect the students sleep quality.

According to one study by Vargas et. al. (2014) on sleep quality and body mass index in college students: the role of sleep disturbances, a convenience sample of about (n=515) college students were used for the survey and PSQI and BMI (self-reported weights and heights), at the end of the study, about 1/3 of the students had BMI ≥ 25 and about 51% were had poor sleep quality and only sleep disturbance were associated to overweight. Concurrently, table 17 signifies the difference between body mass index and PSQI the p-values of sub-scale of sleep latency (X^2=13.100, p<0.05) and sleep disturbance (X^2=8.106, p<0.05). this concludes that BMI affect sleep quality of the students, for the students to avoid being overweight mild exercise and yoga should be done by the students.

5.5. Findings on the relationship of Functional Health Scale and Sleep Quality Scale

According to one study by RJ et al 2016 on relationship between physical function (functional health) and sleep quality in African Americans about (n=450) participants in the study, PSQI was used to measure their sleep quality and Physical functioning was used to measure activity of daily living. At the end of the study they discovered that sleep is an important factor to consider whenever we want to improve physical functioning (functional health). In this study, the correlation result analysis indicates that there is a weak positive relationship between sleep quality and functional health assessment scale. However, the association is not statistically significant (r = 0.005, p >0.05).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1. Conclusion

In this study, majority of the students were single (59.50%), also the highest frequency was for the Year 4 group at (38%). Student age ranges from 21-25years (63.00%). Endometriosis is the most common gynecological problem within the student (42.10%), menarche of the student's highest frequency 11-13years (57.50%), menstrual cycle length from 26days -28days among the student have the highest frequency (49.50%). In the aspect of menstrual pain and marital status there was no significant difference (p>0.05), but in the aspect sleep quality and marital status of the students, single students have the highest sleep quality which denotes poor sleep quality and there was a significant difference in both total scale and sub-scale (p<0.05), when marital status is being compared to FHPAST, there was no significant difference (p>0.05).

In the aspect of PSQI and marital status of the student there is a statistical difference in the total scale and sleep duration sub-scale (p<0.05), In comparison of PSQI and menstrual cramps of the student it indicated that students who said Yes to menstrual cramps during menstruation have the highest functional health (Mean±SD;11.84±2.28) and also the total score and the sleep efficiency sub-scale p<0.05, it indicates that there a significant difference. But, when PSQI and FHPAST were compared there was no statistical difference (p>0.05).

In comparison of FHPAST and country of origin of students, there is a statistical difference in the general well-being subscale of FHPAST (p<0.05). In the comparison of functional health and degree of pain characteristic of the students, total score with the highest functional health score is student with Severe menstrual pain (143.47±11.49), there is a significant difference in the health

promotion sub-scale (p=0.005). However, when PSQI and FHPAST were compared there was no statistical difference (p>0.05).

The correlation result analysis indicates that there is a weak positive relationship between sleep quality and functional health assessment scale. However, the relationship or association is not statistically significant (r = 0.005, p >0.05). A significant difference was found between the FHPAST and PSQI Scales and menstrual cycle frequency and BMI. No significant differences were noted between the scales and Age, Education.

6.2. RECOMMENDATION

Health education program periodically on; cramps and pain relieve methods, personal hygiene etc. For the best sleep quality students should have regular exercise, choose a healthy life-style and stress management during exam periods and premenstrual syndrome periods.

Functional health should be attained by drinking more water and having few sugary things (because the body is primarily composed of water and staying hydrated is a crucial part in physical heath), exercise regularly, eat more fruits and vegetable and less fast food and mostly importantly have a good night sleep. Nursing education on the possible positive effect of menstrual cycle and how it can be alleviated. Further studies:

a. can be conducted on effect socio-demographic variables (education level) on the FHPAST and PSQI
b. can be conducted on endometriosis effects on menstrual cycle.
c. Further research is needed on the impact of premenstrual symptoms on quality of life, and if a brief symptom list could be developed as a valid and reliable tool globally.
d. Qualitative methods are recommended to further understand adolescent girls' sources of information, menstruation- related attitudes and practices, and suggestions on how to help young women cope with this natural process.

REFERENCE

Aganoff, J. A., Boyle, G. J. (1994). Aerobic exercise, mood states and menstrual cycle Symptoms. Journal of Psychosomatic Research; 38:183-92.

Alverez GG, Ayas NT. (2004). The impact of daily sleep duration on health: a review of the literature. Prog Cardiovasc Nurs;19(2):56-59.

American College of Obstetricians and Gynecologists. (2015). Premenstrual Syndrome (PMS)

American Nurses Association [ANA]. (2015). Code of ethics for nurses with interpretive Statements.

Anderson LD, Hirshfield AN. An overview of follicular development in the ovary: From embryo to the fertilized ovum in vitro. Maryland Medical Journal 1992; 41:614–620. [PubMed: 1640818]

Arias, A. J., Steinberg, K., Banga, A., Trestman, R. L. (2006). Systematic review of efficacy of medication techniques as treatments for medical illness. Journal of Alternative and Complementary Medicine; 12(8):817-32.

Armour, M., Smith, C.A., Steel, K.A. et al. The effectiveness of self-care and lifestyle interventions in primary dysmenorrhea: a systematic review and meta-analysis. BMC Complement Altern Med 19, 22 (2019). https://doi.org/10.1186/s12906-019-2433-8.

Baker, F. C., Sassoon, S. A., Kahan, T., Palaniappan, L., Nicholas, C. L., Trinder, J., & Colrain, I. M. (2012). Perceived poor sleep quality in the absence of polysomnographic sleep disturbance in

women with severe premenstrual syndrome. Journal of sleep research, 21(5),535–545.https://doi.org/10.1111/j.1365-2869.2012.01007.x

Barbosa MB, Montebelo MIL, Guirro ECO. Determinação dos limiares de percepção sensorial e de resposta motora nas diferentes fases do ciclo menstrual. Rev Bras Fisioter. 2007;11(6):443-9. doi: 10.1590/S1413-35552007000600005.

Balachandar, V. (2017). Effects of the menstrual cycle on lower limb biomechanics, neuromuscular control, and anterior cruciate ligament injury risk: a systemic review. Muscle, Ligaments and Tendons Journal, 7(1), 136.https://doi.org/10.11138/mltj/2017.7.1.136

Baker, F.C., and Driver, H.S. (2007). Circadian rhythms, sleep, and menstrual cycle. Sleep Med. 8, 613-622.

Benavente SB, Silva RM, Higashi AB, Guido Lde A, Costa AL. (2014). Influence of stress factors and socio-demographic characteristics on the sleep quality of nursing students [Article in Portuguese]. Rev Esc Enferm USP. 2014;48 (3):514-20. https://doi.org/10.1590/S0080-623420140000300018

Bertolazi AN, Fagondes SC, Hoff LS, Dartora EG, Miozzo IC, de Barba ME, et. al. (2011). Validation of the Brazilian Portuguese version of the Pittsburgh Sleep Quality Index. Sleep Med. 2011;12(1):70-5. https:// doi.org/10.1016/j.sleep.2010.04.020

Born J. Sleep and immune functions. In: Schedlowski M, Tewes U, eds. Psychoneuroimmunology. An interdisciplinary introduction. New York: Kluwer Academic/Plenum Publishers 1999.

Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res. 1989;28(2):193-213. https:// doi.org/10.1016/0165-1781(89)90047-4.

Cardoso HC, Bueno FC, Mata JC, Alves AP, Jochims I, Vaz Filho IH, et al. Assessing quality of sleep in medical students [Article in Portuguese]. Rev Bras Educ Med. 2009;33(3):349-55. https://doi. org/10.1590/S0100-55022009000300005.

Carveth, J. A., Gesse T., Moss N. (1996). Survival strategies for nurse Midwifery, 41: 50-54.

Caruso BA, Clasen TF, Hadley C, Yount KM, Haardorfer R, Rout M, et al. (2017). Understanding and defining sanitation insecurity: women's gendered experiences of urination, defecation and menstruation in rural Odisha, India. BMJ Glob Health. 2017;2(4): e000414:29071131.

Centers for Disease Control and Prevention. (2016). 1 in 3 adults don't get enough sleep [Press release]. cdc.gov/media/releases/2016/p0215-enough-sleep.html

Cheng, S. H., Shih, C.-C., Lee, I.H., Hou, Y.-W., Chen, K.C., Chen, K.-T., (2012). A study on the sleep quality of incoming university students. Psychiatric Res. 197,270-274. doi: 10.1016/j.psychres.2011.08.011.

Christiani, D. C., Niv, T., Xu, X. (1995). Occupational stress and dysmenorrheal in women working in cotton textile mills. Int. J. Occup. Environ Health 1995; 1: 9-1

Crichton J, Okal J, Kabiru CW, Zulu EM. (2013). Emotional and psychosocial aspects of menstrual poverty in resource-poor settings: a qualitative study of the experiences of adolescent girls in an informal settlement in Nairobi. Health Care Women Int. 2013;34(10):891–916. pmid:23570366

Constantini NW, Dubnov G, Lebrun CM. (2005). The menstrual cycle and sport performance. Clin Sports Med. 2005;24(2):51-82. doi: 10.1016/j.csm.2005.01.003.

Darlington CL, Ross A, King J, Smith PF. (2001). Menstrual cycle effects on postural stability but not optokinetic function. Neurosci Lett. 2001;307(3):14-50. doi: 10.1016/S0304-3940(01)01933-4 [Links]

Davis, A. (2018). 'Period poverty' sees dozens of schools give free tampons to girls. London Evening Standard, p. 26. Retrieved from http://link.galegroup.com.proxy.binghamton.edu/apps/doc/A543933032/OVIC?u=bingul &sid=OVIC&xid=922ca6c1.

Deeney, C., Sullivan, L. (2009). Work related psychosocial risk and musculoskeletal disorders: potential risk factors, causation and evaluation methods. Scand. J Work 34: 239-48.

Del Pielago Meoño AF, Failoc Rojas VE, Plasencia Dueñas EA, Díaz Vélez C Calidad de sueñoy estilo de aprendizaje en estudiantes de Medicina Humana de la Universidad Nacional Pedro Ruiz Gallo. Act Méd Per. 2013;30(4):63-8.

Dharampal G. Dambhare, Sanjay V. Wagh, Jayesh Y. Dudhe Glob J Health Sci. 2012 Jan; 4(1):105–111. Published online 2012 Jan 1. doi: 10.5539/gjhs. v4n1p105 PMCID: PMC4777020.

Dennerstein, L., Lehert, P., Bäckström, T.C., Heinemann, K. (2009 Premenstrual symptoms—severity, duration and typology: an international cross-sectional study. Menopause International; 15: 120–126.

Dennerstein, L., Lehert, P., Heinemann, K. (2011). Global epidemiological study of variation of Premenstrual symptoms with age and sociodemographic factors. Menopause International; 17(3): 96-101.

De Souza MJ, Miller BE, Loucks AB, Luciano AA, Pescatello LS, Campbell CG, ET AL. (1998). High Frequency of luteal phase deficiency and anovulation in recreational women runners; Blunted elevation in follicle-stimulating hormone observed during luteal-follicular Transition. Journal of Clinical Endocrinology and Metabolism. 1998; 83:4220-32. [PubMed: 9851755].

De Souza MJ. Toombs RJ, Scheid JL, O'Donnell E, West SL, Williams NI. High prevalence of Subtle and severe menstrual disturbance in exercising women: confirmation using Daily hormone measures. Human reproduction 2010; 25:491-503. [PubMed: 19945961].

Devin Kowalczyk, ''Functional health and disability: Definition & Major Issues.'' Study.com, 29 March 2014, study.com/academy/lesson/functional-health-disability-definition-major-issues.html.

Diaz A, Laufer MR, Breech LL, (2006) American Academy of Pediatrics Committee on Adolescence, American College of Obstetricians and Gynecologists Committee on Adolescent Health (November 2006). "Menstruation in girls and adolescents: using the menstrual cycle as a vital sign". Pediatrics. **118** (5): 2245–50. doi:10.1542/peds.2006-2481. PMID 17079600.

Dietz, B. M., Hajirahimkhan, A., Dunlap, T. L., Bolton, J. L. (2016). Botanicals and their bioactive phytochemicals for women's health. Pharmacological Reviews, 68(4): 1026-1073. doi: https://doi.org/10.1124/pr.115.010843(link is external)

Dimsdale JE, Moss J. Short‑term catecholamine response to psychological stress. Psychosom Med 1980; 42:493‑7.

Dolan CS, Ryus CR, Dopson S, Montgomery P, Scott L. (2014). a Blind Spot in Girls' Education: Menarche and Its Webs of Exclusion in Ghana. Journal of International Development.2014;26(5):643–57.

Dong J, et al. (1996). Growth differentiation factor-9 is required during early ovarian folliculogenesis. Nature 1996; 383:531–535. [PubMed: 8849725]

Durkin, A. (2017). Profitable menstruation: How the cost of feminine hygiene products is battle against reproductive justice. Georgetown Journal of Gender and the Law 18(1), 131-172.
 Retrieved   from http://link.galegroup.com/apps/doc/A503262690/AONE?u=acc&sid=AONE&xid=a6a56

Edelman, C.L., & Mandle, C.L., (2006) In D. Como, L. Thomas (Eds.), Health Promotion Throughout the lifespan St. Louis, Missouri: Mosby.

El-Lithy, A., El-Mazny, A., El-Deeb, A. (2014). Effect of aerobic exercise on premenstrual Symptoms, hematological and hormonal parameters in young women. Journal of Obstetrics and Gynecology; 3:1-4.

Fiona C. Baker, Kathryn Aldrich Lee. (2018). sleep Medicine Clinics, Vol. 13, Issue 3, p283-294 DOI:https://doi.org/10.1016/jsmc.2018.04.002s

Friden C, Hirschberg AL, Saartok T, Backstrom T, Leanderson J, Renstrom P. The influence of premenstrual symptoms on postural balance and kinesthesia during the menstrual cycle. Gynecol Endocrinol. 2003;17(6):433-9. doi 10.1080/09513590312331290358 [Links]

F. Thomas, F. Renaud, E. Benefice, T. De Meeüs, and J.-F. Guegan. (2001) "International variability of ages at menarche and menopause: patterns and main determinants," Human Biology, vol. 73, no. 2, pp. 271–290, 2001.View at: Publisher Site | Google Scholar

Ghanbari, Z., Haghollahi, F., Shariat, M., Foroshani, A.R., Ashrafi, M. (2019). Effects of calcium supplement therapy in women with premenstrual syndrome. Taiwanese   Journal of Obstetrics and Gynecology; 48(2): 124–129.

George R. Celebrating Womanhood: How Better Menstrual Hygiene Management Is the Path to Better Health, Dignity and Business: Break the Silence! Geneva, Switzerland: WSSCC, 2013.

Gordon, M. (1994). Nursing Diagnosis: Process and Application, 3d Ed.St. Louis: Mosby.

Harlow SD, Matanoski GM. The association between weight, physical activity, and stress and variation in the length of the menstrual cycle. Am J Epidemiol 1991; 133:38‑49.

Harlow SD, Ephross SA. Epidemiology of menstruation and its relevance to women's health. Epidemiol Rev 1995; 17:265‑86.

Heleno LR et el 2016, Suda EY et el 2009, Caffrey E et el 2009.

Hernandez-Reif, M., Martinez, A., Field, T., Quintero, O., Hart, S., Burman, I. (2000). Premenstrual symptoms are relieved by massage therapy. J Psychosom Obstet Gynecol;21(1)9-15.

Herzberg, S.D. Motu'apuaka, M. L., Lambert, W., Fu, R., Brady, J., & Guise, J.-M. (2017) Orthopaedic journal of sports Medicin,5(7), 232596711771878.https://doi.org/10.1177/2325967117718781

Hirshfield AN. (1991) Development of follicles in the mammalian ovary. International Review of Cytology 1991; 124:43–101. [PubMed: 2001918]

Hofmeister, S; Bodden, S (1 August 2016). "Premenstrual Syndrome and Premenstrual Dysphoric Disorder". American Family Physician. **94** (3): 236–40. PMID 27479626.

House S, Mahon T, Cavill S. (2013). Menstrual hygiene matters: a resource for improving menstrual hygiene around the world. Reproductive Health Matters. 2013;21(41):257–9.

National Institute for Health Research, U.K. (2008). Dietary supplements and herbal remedies for premenstrual syndrome (PMS): a systematic research review of the evidence for their efficacy(link is external)

Jessica C. L, Elizabeth Miller, Bethany L. Hafer, Mary F. Reidell, Daniel J. Buysse, Peter L. Franzen. Received 24 November 2015, Revised 26 February 2016, Accepted 20 March 2016, Available online 5 May 2016. https://doi.org/10.1016/j.sleh.2016.03.006

Julian, R., Hecksteden, A., Fullagar, H.H., Meyer, T. (2017). The effect of menstrual cycle Phase on physical performance in female soccer players. PLoS One:12(3): e0173951.

Jump up to: a b c Women's Gynecologic Health. Jones & Bartlett Publishers. 2011. p. 94. ISBN 9780763756376. Archived from the original on 26 June 2015.

Kane, J. (2017) Here's how much a woman's period will cost her over a lifetime. Huffington Post. Retrieved from http://www.huffingtonpost.com/2015/05/18/period-cost-lifetime n 7258780.html.

Kaur, G., Gonsalves, L., Thacker, H. L. (2004). Premenstrual dysphoric disorder: a review for the treating practitioner. Cleveland Clinic Journal of Medicine; 71:303-5, 312-3,317-8.

Kissling, E.A (2006). Capitalizing on the curse: the business of menstruation, Lynne Rienner Publishers.

Kirmizigil, B., Demiralp, C. Effectiveness of functional exercises on pain and sleep quality in patients with primary dysmenorrhea: a randomized clinical trial. Arch Gynecol Obstet **302,** 153–163 (2020). https://doi.org/10.1007/s00404-020-05579-2

Kivimaki, M., Virtanen, M., Flovainio, M. et al. (2006) Work stress in the etiology of coronary heart disease- a meta-analysis, Scand. J. Work Environ Health. 32: 431-42.

Komada Y, Ikeda Y, Sato M, Kami A, Masuda C, Shibata S (2019) Subjective Sleep Disturbance and Psychological Distress Are Associated with Menstrual Problems. J Women's Health Care 8:472. doi: 10.35248/2167-0420.19.8.472.

Krenz A, Strulik H. (2018). Menstruation hygiene management and work attendance in a developing country. SSRN 3305598. 2018.

Kudielka BM, Kirschbaum C. (2005). Sex differences in HPA axis responses to stress: A review. Biol Psychol 2005; 69:113‑32.

Kuhlmann, A. S., Henry, K., & Wall, L. L. (2017). Menstrual hygiene management in resource-poor countries. Obstetrical & Gynecological Survey, 72(6), 356-376. DOI: 10.1097/OGX.0000000000000443.

Kurlander, K. (2019). Menstrual Hygiene and Vulnerable Populations: Examining the Role of Nursing in Issues of Social Justice. Alpenglow: Binghamton University Undergraduate Journal of Research and Creative Activity, 5(1). Retrieved from https://orb.binghamton.edu/alpenglowjournal/vol5/iss1/2

L. Bernstein, R.K. Ross, R.A. Lobo, R. Hanisch, M.D. Krailo & B.E. (1987). Henderson. Departments of Preventive Medicine and Obstetrics and Gynecology, University of Southern California School of Medicine, Los Angeles, California 90033.USA. (1987), 55, 681-685.

Lemma S, Berhane Y, Worku A, Gelaye B, Williams MA. (2014). Good quality sleep is associated with better academic performance among university students in Ethiopia. Sleep Breath. 2014;18(2):257-63. https://doi.org/10.1007/s11325-013-0874-8

Little, A. (2015). The hardest period: Menstrual hygiene of homeless women. Ms. Magazine, 25(3), p.11(1). Retrieved from https://www.period.org/blog/2017/5/21/quinn.

Lin HT, Lin LC, Shiao JS. (2007). The impact of self‑perceived job stress on menstrual patterns among Taiwanese nurses. Ind Health 2007; 45:709‑14.

Loucks AB, Mortola JF, Girton L, Yen SS. (1989). Alterations in the hypothalamic‑pituitary‑ovarian and the hypothalamic‑Pituitary‑adrenal axes in athletic women. J Clin Endocrinol Metab 1989; 68:402‑11.

Long J, Caruso BA, Lopez D, Vancraeynest K, Sahin M, Andes KL, et al. (2013). WASH in Schools Empowers Girls' Education in Rural Cochabamba, Bolivia: An Assessment of menstrual hygiene management in schools. New York: United Nations Children's Fund, 2013.

Lukes AS, Baker J, Eder S, Adomako TL. (2012). Daily menstrual blood loss and quality of life in women with heavy menstrual bleeding. Womens Health (Lond). 2012 Sep;8(5):503-11. doi: 10.2217/whe.12.36. PMID: 22934724.

Marjoribanks J, Brown J, O'Brien PM, Wyatt K Cochrane Database Syst Rev. (2013) Jun 7; (6):CD001396. (PubMed) (Ref list).

Mei, Z. et al. (2010). Work and Family Stress is associated with menstrual disorders but not with Fibrolytic changes: cross-sectional findings in Chinese working women. J-occupational Health. 52: 361-366.

Mason L, Nyothach E, Alexander K, Odhiambo FO, Eleveld A, Vulule J, et al. (2013).'We keep it secret so no one should know'—a qualitative study to explore young schoolgirls attitudes and experiences with menstruation in rural western Kenya. PLoS ONE. 2013;8(11): e79132. pmid:24244435

Matzuk MM, et al. (2002). Intercellular communication in the mammalian ovary: oocytes carry the conversation. Science 2002; 296:2178–2180. [PubMed: 12077402]

Miller EH. Women and insomnia. Clin Cornerstone 2004;6 Suppl1B:S8-18.

Mori, S. C. (2000). Addressing the mental health concerns of international students. Journal of counseling and development, 78, 137-144.

Nagata C, Kaneda N, Kabuto M, Shimizu H. (1997). Factors associated with serum levels of estradiol and sex hormone-binding globulin among premenopausal Japanese women Environmental Health Perspectives. 1997; 105:994–7. [PubMed: 9300929]

Orff, H.J., Meliska, C.J., Martinez, L. F., and Parry, B.L. (2014). The influence of sex and gonadal hormones on sleep disorders. Chronophysiol. Ther.4, 15-25.

Pagnin D, de Queiroz V, Carvalho YT, Dutra AS, Amaral MB, Queiroz TT. (2014). The relation between burnout and sleep disorders in medical students. Acad Psychiatry. 2014;38(4):438-44. https://doi. org/10.1007/s40596-014-0093-z.

Pamela, L. (2009). Premenstrual syndrome and academic stress in emerging adulthood women. Available at: (http://www.nursing,arizona.edu/library/091)

Pangas SA, Matzuk MM. Genetic models for transforming growth factor beta superfamily signaling in ovarian follicle development. Mol Cell Endocrinol 2004; 225:83–91. [PubMed: 15451572]

71

Perla A. Vargas, Melissa Flores, BA, and Elias Robles, Southwest Interdisciplinary Research Center, Arizona State University, Glendale, Arizona, 4701 W Thunderbird Rd, Mc 3051, Glendale, AZ 85306-4908, USA J Am Coll Health. 2014 Nov-Dec; 62 (8): 534-541. doi:10.1080/07448481.2014.933344.

Phillips-Howard PA, Nyothach E, ter Kuile FO, Omoto J, Wang D, Zeh C, et al. (2016). Menstrual cups and sanitary pads to reduce school attrition, and sexually transmitted and reproductive tract infections: a cluster randomized controlled feasibility study in rural western Kenya. BMJ Open. 2016;6(11): e013229. pmid:27881530

Parveen N, Majeed R, Zehra N, Rajar U. Munir AA (2009). Attitude and knowledge of Medical students of Isra University about dysmenorrhea and its treatment. J Ayub Med Coll Abbottabad 21:159-162.

Population Reference Bureau (2011) The world's women and girls – 2011 data sheet. Available At www.prb.org/ pdf11/world-women-girls-2011-data-sheet.pdf.

Pivarnik, J. M., Marichal, C. J., Spillman, T., & Morrow, J. R. (1992). Menstrual cycle phase affects temperature regulation during endurance exercise in menstrual cycle of athletic and non-athletic women. Journal of Applied Physiology, 50(6), 1300-1305. https://doi.org/10.1152/jappl.1981.50.6.1300.

Preišegolavičiūtė E, Leskauskas D, Adomaitienė V. (2010). Associations of quality of sleep with lifestyle factors and profile of studies among Lithuanian students. Medicina (Kaunas). 2010;46(7):482-9.

Ribeiro CR, Oliveira SM, Silva YM. (2014). The impact of sleep quality in medical education [Article in Portuguese]. Rev Soc Bras Clin Med. 2014;12(1):8-14.

Saygin, M., Onder Ozturk, T. G., Has, M., Hayri, U. B., Kurt, Y., M. A., et al. (2016). Investigation of sleep quality and sleep disorder in students of medicine. Turk. Thorac. J. 17, 132-140.doi: 10.5578/ttj.30513.

Singh R, Goyal M, Tiwari S, Ghildiyal A, Nattu SM, Das S. (2012). Effect of examination stress on mood, performance and cortisol levels in medical students. Indian J Physiol Pharmacol 2012; 56:48‑55.

Smith MJ, Adams LF, Schmidt PJ, Rubinow DR, Wassermann EM. (2002). Effects of ovarian hormones on human cortical excitability. Ann Neurol. 2002;51(5):599-603. doi: 10.1002/ana.10180 [Links]

Sommer M, Caruso BA, Sahin M, Calderon T, Cavill S, Mahon T, et al. (2016). A time for global action: addressing girls' menstrual hygiene management needs in schools. PLoS Med.2016;13(2): e1001962. pmid:26908274

Sommer M. (2009). Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in northern Tanzania. Cult Health Sex. 2009;11(4):383–98. Epub 2009/03/28. pmid:19326264.

Sommer M. (2010). Where the education system and women's bodies collide: The social and health impact of girls' experiences of menstruation and schooling in Tanzania. J Adolesc. 2010;33(4):521–9. Epub 2009/04/28. pmid:19395018.

Sommer M, Sahin M. (2013). Overcoming the taboo: advancing the global agenda for menstrual hygiene management for schoolgirls. American journal of public health. 2013;103(9):1556–9. pmid:23865645

Sommer B. (1973). The effect of Menstruation on cognitive and perceptual-motor behavior. psychosom Med. 1973 Nov-Dec :35(6):515-34 (PubMed) (Ref List).

S. Pokhrel, N. Mahantashetti, M. Angolkar, and N. Devkota. (2014) "Impact of health education on knowledge, attitude and practice regarding menstrual hygiene among pre-university female students of a college located in urban area of Belgaum," Journal of Nursing and Health Science, vol. 3, nog. 4, pp. 38–44, 2014.View at: Google Scholar

Stansfield, S., Candy, B. (2006). Psychosocial work environment and mental wealth- a Meta analytic review. Scand. J work Environ Health. 32: 443-62.
 Stephanie Watson 2018.https://www.healthline.com/health/womens-health/stages-of-menstrual-cycle.

Speroff, L.; Fritz, MA. Clinical Gynecologic Endocrinology and Infertility. Lippincott Williams & Wilkins; 2005

Suman B, Mrunalini G, Jyoti M (2013). School Absenteeism during menstruation among Students. National journal of community medicine 4:2229-6816.

Sushree Sangeeta Kar, Manju Agrawala (2018). Sleep quality during phases of menstrual cycle: Vol: 5, Issue:33, Page: 2419-2423, doi: 10.18410/jebmh/2018/499

Winer, S. A., Raokin, A. J. (2006). Premenstrual disorder: prevalence, etiology and impact. Journal of Reproductive Medicine; 51(4 Suppl):339-347.

Women's Gynecologic Health. Jones & Bartlett Publishers. 2011. P.94.ISBN 9780763756376. Archived from the original on 26 June 2015.

Thorpe Jr RJ, Gamaldo AA, Salas RE, Gamaldo CE, Whitfield KE. Relationship between physical function and sleep quality in African Americans. J Clin Sleep Med 2016;12(10):1323–1329.

Troxel WM; Buysse DJ; Matthews KA; Kravitz HM; Bromberger JT; Sowers M; Hall MH. (2010). Marital/cohabitation status and history in relation to sleep in midlife women. SLEEP 2010;33(7):973-981.

Tsai, S.Y. (2016). Effect of Yoga Exercise on Premenstrual Symptoms among Female Employees in Taiwan. Int J Environ Res Public Health; 13(7).

Tworoger SS, Messer SA, Eliassen AH, Barbieri RL, Dowsett M, Hankinson SE. (2007). Physical activity and inactivity in relation to sex hormone, prolactin, and insulin-like growth factor concentrations in premenopausal women - exercise and premenopausal hormones. Cancer Causes and Control. 2007; 18:743–52. [PubMed: 17549594]

Verkasalo PK, Thomas HV, Appleby PN, Davey GK, Key TJ. (2001). Circulating levels of sex hormones and their relation to risk factors for breast cancer: a cross-sectional study in - and postmenopausal women (United Kingdom). Cancer Causes and Control. 2001; 12:47–59. [PubMed: 11227925]

Winkelman, M. (1994). Culture shock and adaptation Journal of counseling and Development, 73, 121126

World Health Organization Task Force on Adolescent Reproductive Health. 1986. World Health Organization multicenter study on menstrual and ovulatory patterns in adolescent girls. I. A multicenter cross-sectional study of menarche. J Adolesc Health Care 7(4):229–35.

Xianchen Liu, Hua Chen, Zhen-Zhen Liu, Fang Fan and Cun-Xian Jia: Sleep, Volume 40, Issue 9, September 2017, zsx107, https://doi.org/10.1093/sleep/zsx107

APPENDIX 1 QUESTIONNAIRES

   THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY AMONG UNIVERSITY FEMALE STUDENT DURING THEIR MENSTRUAL CYCLE.

This questionnaire is for survey purpose to investigate the relationship between functional health and sleep quality among female university students. Any information in connection with this study that can be identified with you remains confidential. Thank you for your participation.

 SECTION A: SOCIO DEMOGRAPHIC CHARACTERISTICS

 Please tick and write where necessary

1. Your age………………………

2. What year are you at the university?................................

3. Country of origin.

   a. Nigeria []

   b. Ghana []

c. Zimbabwe []

d. Gambia []

4. Marital status

   a. Married []

   b. Single []

   c. Widowed []

   d. Divorced []

5. What is your body weight?..........................

6. General opinion, what would you say your health is?

   a. Excellent []

   b. Good []

   c. Fair []

   d. Poor []

7. Do you have any gynecological problems?

   a. Yes [] if yes, please answer question 10

   b. No []

8. Which gynecological problem do you have?

   a. Ovarian cyst []

   b. Endometriosis []

   c. Pelvic inflammatory disease []

   d. Others (please mention) ………………………….

9. At what age did your menstruation start? ……......years

10. What is your menstrual cycle length? (From the first day of one period to next first day of another period) ……………days

11.How often do you see your menstruation?

   a. Once a month []

   b. Twice a month []

   c. Interval of two months []

   d. Interval of four months []

12.How many days is your menstrual bleeding length?

   a. 2days []

b. 3days []

c. 4days []

d. 7 days []

13. Do you experience menstrual cramps in every menstrual cycle?

a. Yes []

b. No []

c. Sometimes []

14. If yes, please tick your degree of pain experienced during your menstruation on the scale given below. (X)

No pain…………………...Moderate………………………. Severe

15. Do you experience menstrual sleep disturbance?

a. Yes…………….

b. No……………….

c. Sometimes……………….

16. Do you have interrupted sleep during your menstrual cycle?

a. Yes

b. No

c. Sometimes

17. Which day do you have interrupted sleep?

a. 1st day

b. 2nd day

c. 3rd day

18. During your menstruation, how often have you had psychological problems in the following scenarios? Please rate in a scale of 0-5 {5-Severe, 3-Moderate, 0-None}

	Cannot get to sleep within early.	
	Would wake up in the middle of the night or early morning, to check whether the bed is stained	
	Have pain	
	Have to get use to changing sanitary pad	
	Has fever	
	Relationship with fellow students and lectures	

19. During your menstrual cycle, how often would pain interfere with your normal daily social activities? Please rate in a scale of 0-5 {3-Moderate, 5- Extreme, 0- A little bit.

	Visiting friends, family members and interaction with other people	
	Going for social gatherings and parties	
	Going to night clubs	
	Going for shopping , theatre trips and sailing	

20. During your menstrual cycle, have you had any of the following physical problems with your school regular daily activities? Please rate in a scale of 0-5 {5 – Yes, 3- Sometimes, 0-No}

	Reduced the amount of time you spent on school 's activities or other activities	
	Were limited in the kind of school or other activities	
	Accomplished less than you would like	
	Had difficulty performing at school or other activities (for example, it took extra effort)	

21. At what rate do the following physical activities difficult during your menstrual cycle? Please rate in a scale of 0-5 {0means no difficulty, 1-Moderate, 5-Severe}

	Vigorous activities; lifting heavy object, running and participating in strenuous exercise	
	Climbing several flights of stairs	
	Moderate activities; playing golf, bowling, moving table and pushing vacuum cleaner.	
	Lifting or carrying groceries	
	Bending, kneeling or stooping	

APPENDIX 2; FUNCTIONAL HEALTH PATTERN ASSESSMENT SCREEING TOOL SCALE

Functional Health Pattern Assessment Screening Tool

Directions: Below are a series of items designed to screen behaviors that affect your health. Please read each item and circle one number for the response that best applies to you over the past **four** weeks.

Definition of Responses

1. **Never _or_ does not occur**
2. **Sometimes _or_ occurs sporadically**
3. **Often _or_ occurs occasionally but not on a routine basis**
4. **Routinely _or_ occurs the majority of the time.**

Demographics:

1. Age: _____   3. Race: _____

2. Sex: F _____ M _____   4. Religion: _____

	Never	Sometimes	Often	Routinely	Do your Comments
1. I have enough energy for my daily activities.	1	2	3	4	
2. I do aerobic exercise for at least 20 minutes three or more times a week.	1	2	3	4	
3. I feel rested when I awake.	1	2	3	4	
4. I feel good about myself.	1	2	3	4	
5. I am able to cope with the stresses in my life.	1	2	3	4	
6. I have someone that I can talk to when I need help or support.	1	2	3	4	
7. Religious or spiritual practices give meaning to my life.	1	2	3	4	
8. I am comfortable with my sexuality.	1	2	3	4	
9. My health is important to me.	1	2	3	4	
10. I can make changes in my life-style to improve my health.	1	2	3	4	
11. I intentionally limit my dietary intake of fat.	1	2	3	4	
12. I feel comfortable with my weight.	1	2	3	4	
13. I heal easily.	1	2	3	4	
14. I fall to sleep without a problem.	1	2	3	4	
15. I feel hopeful about the future.	1	2	3	4	
16. I feel like I am in control of my life.	1	2	3	4	
17. I like the way I look.	1	2	3	4	
18. I feel good about the decisions I make.	1	2	3	4	
19. I am satisfied with my ability to solve problems.	1	2	3	4	

	Never	Sometimes	Often	Routinely	Comments
20. I seek immediate attention for changes in my health.	1	2	3	4	
21. I am able to adjust to changes in my life.	1	2	3	4	
22. I have an annual health examination.	1	2	3	4	
23. I am able to follow recommendations from my health care provider.	1	2	3	4	
24. I wear a seat belt.	1	2	3	4	
25. I avoid the sun or use sunscreen.	1	2	3	4	
26. I am in excellent health.	1	2	3	4	
27. I am happy with my life.	1	2	3	4	
28. I am able to hear clearly.	1	2	3	4	
29. I am able to concentrate for a long period of time.	1	2	3	4	
30. I am able to learn new information easily.	1	2	3	4	
31. The choices I make about my life are consistent with my values.	1	2	3	4	
32. I eat 5-6 servings of fruits and vegetables each day.	1	2	3	4	
33. I drink six to eight glasses of water a day.	1	2	3	4	
34. I am satisfied with what I do for work.	1	2	3	4	
35. I feel comfortable with the role I play in my family.	1	2	3	4	
36. I am satisfied with my social life.	1	2	3	4	
37. I feel comfortable expressing my feelings and emotions.	1	2	3	4	
38. I feel I can easily communicate with others.	1	2	3	4	
39. I have a usual routine that I perform to help me relax.	1	2	3	4	
40. I consider myself to be healthy.	1	2	3	4	
41. It is a burden to participate in family caretaking activities.	1	2	3	4	
42. I have difficulty urinating.	1	2	3	4	
43. I have problems with bowel elimination.	1	2	3	4	
44. When I drink alcohol, wine or beer, I feel guilty	1	2	3	4	
45. I use recreational drugs.	1	2	3	4	
46. I smoke cigarettes.	1	2	3	4	
47. I have difficulty with my vision.	1	2	3	4	
48. My physical abilities limit my daily activities.	1	2	3	4	

49. I have difficulty controlling my anger.	1	2	3	4	
50. I feel unusual physical symptoms with walking	1	2	3	4	
51. I worry a lot.	1	2	3	4	
52. I feel at risk for physical harm.	1	2	3	4	
53. I experience physical discomfort when I am under stress.	1	2	3	4	
54. I feel stress, tension, or pressure.	1	2	3	4	
55. I experience pain that interrupts my daily activities.	1	2	3	4	
56. I have family problems that I find are difficult to handle.	1	2	3	4	
57. I fear for my safety.	1	2	3	4	

© Foster & Jones, 1997 - 2008

APPENDIX 3; PITTSBURG SLEEP QUALITY SCALE

Subject's Initials ID# Date Time PM PITTSBURGH SLEEP QUALITY INDEX
INSTRUCTIONS: The following questions relate to your usual sleep habits during the past month
only. Your answers should indicate the most accurate reply for the majority of days and nights in
the past month. Please answer all questions.

1. During the past month, what time have you usually gone to bed at night? BED TIME
_____

2. During the past month, how long (in minutes) has it usually takes you to fall asleep each night? NUMBER OF MINUTES _____

3. During the past month, what time have you usually gotten up in the morning? GETTING UP TIME _____

4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) HOURS OF SLEEP PER NIGHT _____

For each of the remaining questions, check the one best response. Please answer all questions.

5. During the past month, how often have you had trouble sleeping because you . . .

    a) Cannot get to sleep within 30 minutes

      Not during the   On the 2nd day   On the 3rd day
      of menstruation_____   of menstruation_____   of the menstruation_____

    b) Wake up in the middle of the night or early morning

      Not during the   On the 2nd day   On the 3rd day
      menstruation_____   of menstruation_____   of menstruation_____

    c) Have to get up to use the bathroom

    Not during the   On the 2nd day   On the 3rd day
    menstruation_____ of menstruation_____   of menstruation_____

    d) Cannot breathe comfortably

      Not during the   On the 2nd day   On the 3rd day
      menstruation_____   of menstruation_____   of menstruation_____

    e) Cough or snore

      Not during the   On the 2nd day   On the 3rd day
      menstruation_____   of menstruation_____   of menstruation_____

    f) Feel too cold

      Not during the   On the 2nd day   On the 3rd day
      menstruation_____   to menstruation_____   to menstruation_____

    g) Feel too hot

      Not during the   On the 2nd day   On the 3rd day

menstruation_____   to menstruation_____   to menstruation_____

h) Had bad dreams

Not during the   On the 2nd day   On the 3rd day

menstruation_____   to menstruation_____   to menstruation_____

i) Have pain

During the   On the 2nd day   On the 2nd day

menstruation_____   of menstruation_____   to menstruation_____

j) Other reason(s), please describe_____

6. How often during your menstruation have you had trouble sleeping because of premenstrual or menstrual cycle?

During the   On the 2nd day   On the 2nd and 3rd day

menstrual cycle_____   of menstruation_____   to menstruation_____

7. During your menstrual cycle (both premenstrual and menstrual), how would you rate your overall sleep quality?

Very good_____   Fairly good_____   Fairly bad_____ Very bad_____

8. During your menstrual cycle, how often have you taken medicine to help you sleep (prescribed or "over the counter")?

During the   On the 2nd day   On the 2nd and 3rd day

premenstrual cycle_____   to menstruation_____   of menstruation_____

9. During your premenstrual and menstrual cycle, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

During the   On the 2nd day   On the 2nd and 3rd day

premenstrual cycle_____   to menstruation_____   of menstruation_____

10. During your menstrual cycle, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

No problem at all _____ Only a very slight problem _____ Somewhat of a problem _____ A very big problem _____

11. Do you have a bed partner or roommate?

No bed partner or roommate _____ Partner/roommate in other room _____

Partner in same room, but not same bed _____ Partner in same bed _____

If you have a roommate or bed partner, ask her how often during your menstrual cycle both premenstrual and menstrual you have had . . . .

Loud snoring

During the	On the 3rd and 4th day	After the
Premenstrual cycle_____	of menstruation_____	menstruation _____

Long pauses between breaths while asleep

During the	On the 2nd day	On the 3rd and 4th day
Premenstrual cycle_____	of menstruation_____	of menstruation_____

Legs twitching or jerking while you sleep

During the	On the 2nd day	On the 3rd day
menstrual cycle_____	of menstruation_____	of menstruation_____

Episodes of disorientation or confusion during sleep

None during the	No episodes
Menstrual cycle_____	at all_____

e) Other restlessness while you sleep; please describe_____

During the	During the	On the 2nd day
menstrual cycle_____	premenstrual cycle_____	of menstrual cycle _____

APPENDIX 4; CURRICULUM VITAE

CHINYERE JENNIFER **UZOMA**

Jennac de Claris, Ihiagwa, Owerri West LGA, Imo State · 09031727445
emmanuelphils18@gmail.com
To work with integrity and contribute immensely to the present and future goals of health care delivery.
PERSONAL DATA
Date of Birth: 23rd March, 1992
Sex: Female
Marital Status: Single
Nationality: Nigerian
State of Origin: Imo State

LGA: Owerri-West LGA

EXPERIENCE

2016 – 2017

NURSE, JAHUN GENERAL HOSPITAL

2017 – 2019

ICU/NBU NURSE, MEDECINS SANS FRONTIERS

EDUCATION

1998 - 2004

FSLC, ASSUMPTA INTERNATIONAL PRIMARY SCHOOL, OWERRI, IMO STATE.

2004 - 2010

SSCE, HOLY ROSARY INTERNATIONAL COLLEGE, OWERRI, IMO STATE.

2010 - 2015

BNSC (BACHELOR IN NURSING SCIENCE), MADONNA UNIVERSITY, ELELE CAMPUS,

RIVERS STATE.

2019-2020

MSC (PUBLIC HEALTH NURSING), NEAR EAST UNIVERSITY, NICOSIA, TURKISH REPUBLIC OF NORTHERN CYPRUS.

SKILLS

☐ Excellent Patient Care Skill

☐ Ability to function effectively as team and also

as an individual.

☐ Good Documentation and Reporting Skill

☐ Ability to work under stress and with Little

or no supervision

☐ Empathy, Compassionate and Pro Active

☐ Good Inter-personal relationship

REFEREES

Mrs. Vivian Duru

Matron, A & E Department, Federal Medical Center, Owerri

08036261003, 07035632668.

Mr. Adamu N. Zakar

HOD, Department of Nursing, Jahun General Hospital, Jigawa State

0701100147

APPENDIX 5; ETHICAL COMMITTEE PERMISSION

YAKIN DOĞU ÜNİVERSİTESİ
BİLİMSEL ARAŞTIRMALAR ETİK KURULU

ARAŞTIRMA PROJESİ DEĞERLENDİRME RAPORU

Toplantı Tarihi	: 28.05.2020
Toplantı No	: 2020/79
Proje No	: 1091

Yakın Doğu Üniversitesi Hemşirelik Fakültesi öğretim üyelerinden Doç. Dr. Hatice Bebiş'in sorumlu araştırmacısı olduğu, YDU/2020/79-1091 proje numaralı ve **"Determining the Relationship Between Functional Health and Sleep Quality Among University Female Student in their Menstrual Cycle."** başlıklı proje önerisi kurulumuzca online toplantıda değerlendirilmiş olup, etik olarak uygun bulunmuştur.

Prof. Dr. Rüştü Onur

Yakın Doğu Üniversitesi

Bilimsel Araştırmalar Etik Kurulu Başkanı

APPENDIX 6; INSTITUTION PERMISISON AND DEANS PERMISSION

20.05.2020

Doç Dr.Hatice Bebiş'in sorumlu araştırmacı olduğu Fakültemiz Halk Sağlığı Hemşireliği AD'dalında Yüksek Lisan eğitimine devam eden tez öğrencisi 20186344 Chinyere Jennifer Uzoma'nın **"Determing the Relationship Between Functional Health and Sleep Quality Among University Female Student in their Menstrual Cycle."** isimli çalışmasının okulumuz öğrencileri ile yapılması uygundur.

Saygılarımla.

Prof. Dr. Hatice Bebiş

YDÜ Hem. Fak. Dekanı Yrd.

APPENDIX 7; FUNCTIONAL HEALTH PATTERN ASSESSMENT SCREENING TOOL PERMISSION

BOSTON COLLEGE SCHOOL OF NURSING
CHESTNUT HILL, MASSACHUSETTS
02167-3812

FUNCTIONAL HEALTH PATTERN ASSESSMENTS SCREENING TOOL

To whom it may concern:

This is to inform you that you have been granted permission to use the Functional Health Pattern Assessment Screening Tool (FHPAST copyright 1997, revised 2015) in your current research. We ask that in return for granting this request you send us a copy of your data and cite the FHPAST in your reference list. A copy of the most recent psychometric evaluation has been included for your review.

Please complete and return one copy of this letter to Dr. Dorothy Jones at Boston College School of Nursing Dorothy.jones@bc.edu.

    A. Title of Current Research:

THE RELATIONSHIP BETWEEN FUNCTIONAL HEALTH AND SLEEP QUALITY AMONG UNIVERSITY
FEMALE STUDENT DURING THEIR MENSTRUAL CYCLE.

Authors and Location:
RESEARCHER; UZOMA CHINYERE JENNIFER. LOCATION; NEAR EAST UNIVERSITY NICOSIA, TURKISH REPUBLIC OF NORTHERN CYPRUS.

Population being Studied:

UNIVERSITY FEMALE STUDENT {PRECISELY UNDERGRADUATE NURSING

STUDENT}

We wish you much success in your research and look forward to the results of your investigation.

Sincerely yours,

Dorothy Jones EdD, RNC, FAAN, FNI -Professor of Nursing and Director of the Marjory Gordon Program for Knowledge Development and Clinical Reasoning at Boston College

Frances Barrett Foster MS, RN, CS Advanced Nurse Practitioner

APPENDIX 8; PITTBURG SLEEP QUALITY SCALE PERMISSION

Sent on behalf of Dr. Buysse

Dear Uzoma Chinyere Jennifer,

You have my permission to use the PSQI for your research study. You can find the instrument, scoring instructions, the original article, links to available translations, and other useful information at www.sleep.pitt.edu under the Measures/Instruments tab. Please ensure that the PSQI is accurately reproduced in any on-line version (including copyright information). We request that you do cite the 1989 paper in any publications that result.

Note that Question 10 is not used in scoring the PSQI. This question is for informational purposes only, and may be omitted during data collection per requirements of the particular study.

This copyright in this form is owned by the University of Pittsburgh and may be reprinted without charge only for non-commercial research and educational purposes. You may not make changes or modifications of this form without prior written permission from the University of Pittsburgh. If you would like to use this instrument for commercial purposes or for commercially sponsored research, please contact the Office of Technology Management at the University of Pittsburgh at 412-648-2206 for licensing information.

Good luck with your research.

Sincerely,

Daniel J. Buysse, M.D.
Professor of Psychiatry and Clinical and Translational Science
University of Pittsburgh School of Medicine
E-1123 WPIC
3811 O'Hara St.
Pittsburgh, PA 15213
T: (412) 246-6413
F: (412) 246-5300
buyssedj@upmc.edu

This e-mail may contain confidential information of UPMC or the University of Pittsburgh. Any unauthorized or improper disclosure, copying, distribution, or use of the contents of this e-mail and attached document(s) is prohibited. The information contained in this e-mail and attached document(s) is intended only for the personal and confidential use of the recipient(s) named above.

If you have received this communication in error, please notify the sender immediately by e-mail and delete the original e-mail and attached document(s).

From: Buysse, Daniel<BuysseDJ@upmc.edu>
Sent: Friday,May1,2020   9:44   AM
To: Gasiorowski,   Mary   <GasiorowskiMJ@upmc.edu>
Subject: Fw: Permission to use the Pittsburgh Sleep Assessment Quality Index (PSQI)Scale

master

APPENDIX